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US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT
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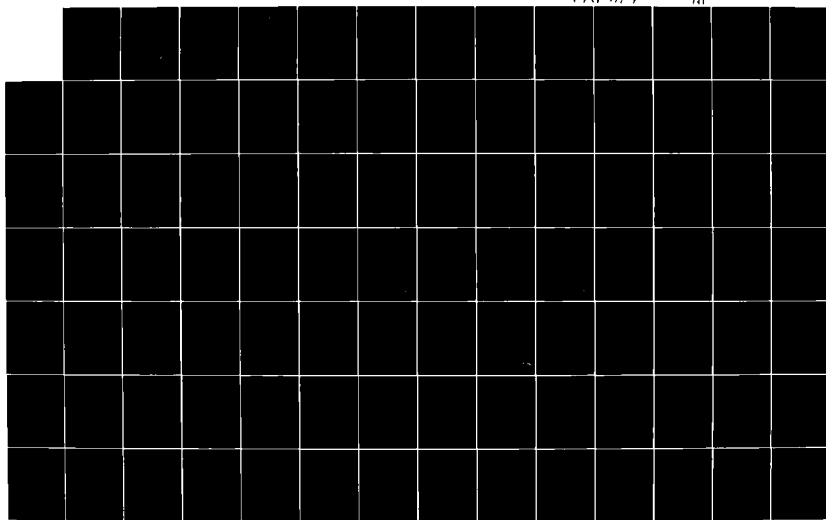
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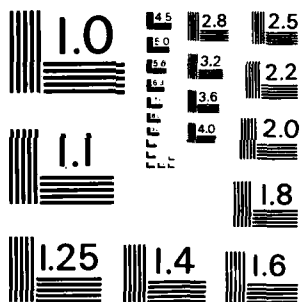
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REPORT MEDDH-288 (R1)

US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LABORATORY
ANNUAL PROGRESS REPORT FY83

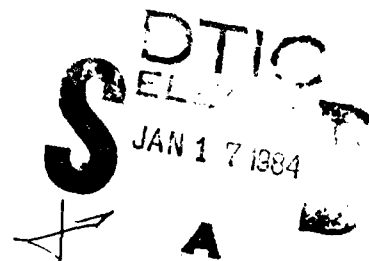
US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LABORATORY
Fort Detrick
Frederick, MD 21701

1 October 1983

Annual Progress Report for Period 1 October 1982 - 30 September 1983

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US ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
Fort Detrick
Frederick, MD 21701



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4. TITLE (and Subtitle) US Army Medical Bioengineering Research and Development Laboratory Annual Progress Report FY83		5. TYPE OF REPORT & PERIOD COVERED 1 Oct 1982 - 30 Sep 1983
7. AUTHOR(s) THOMAS L. TRUDEAU, COL MSC		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Medical Bioengineering Research and Development Laboratory Fort Detrick, Frederick, MD 21701		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Medical Research and Development Command Fort Detrick, Frederick, MD 21701		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS See Reverse
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Field Sanitation and Water, Conventional Weapon Systems, Smokes/Obscurants, Synthetic or Alternative Fuels, Environmental Quality, Installation Restoration, Aquatic Toxicology, Chemical Patient Decontamination Apparatus, Combat Medical Material, Environmental Fate, Field Dental Equipment, Chemical Protective Equipment, Field X-Ray Equipment, Hazardous/Toxic Waste Disposal, Pest Management. (See Reverse)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The Annual Progress Report, Fiscal Year 1983, summarizes research performed by the US Army Medical Bioengineering Research and Development Laboratory in projects authorized by The Surgeon General, the US Army, and the Commander, US Army Medical Research and Development Command and supported by RDTE funds from the US Army Medical Research and Development Command.		

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PREFACE

The United States Army Medical Bioengineering Research and Development Laboratory (USAMBRDL), a subordinate unit of the United States Army Medical Research and Development Command (USAMRDC), is located at Fort Detrick, Maryland. Current mission is:

Conducts research and development on medical, dental and pest management materiel on a continuing basis for the Army and on an as-required basis for the Navy and Air Force. Performs research and development on new delivery systems for insecticide dispersal to control arthropods. Constructs prototypes and test models of selected medical equipment and performs developmental testing of them. Performs research and development for Corps of Engineers on militarily unique pollutants from Army industrial operations. Conducts health hazard assessment for materiel developers of smokes, obscurants and synfuels. Conducts research and development of soldier occupational health hazards, e.g., solids, liquids, toxic gases and synfuels; devises strategies to eliminate exposure or define criteria for safe exposure standards.

MANPOWER

	<u>1 Oct 82</u> <u>Authorized</u>	<u>Actual</u>	<u>30 Sep 82</u> <u>Authorized</u>	<u>Actual</u>
Officer	19	21	18	19
Enlisted	15	13	15	13
Civilian	<u>101</u>	<u>99</u>	<u>103</u>	<u>101</u>
 TOTAL	 135	 133	 136	 133

Professional disciplines represented in the organization include:

Aquatic Biology	Engineering
Biostatistics	Biomedical
Biomedical Maintenance Technology	Chemical
Chemistry	Electrical
Analytical	Electronics
Biochemistry	Mechanical
Polymer	Sanitary/Environmental
Computer Sciences	Graphic and Photographic Arts
Engineering Crafts and Drafting	Operating and Photographic Arts
Entomology	Operating Room Nursing
Environmental Microbiology	Pharmacology
	Toxicology

BUDGET

IN-HOUSE

<u>PROJECT</u>	<u>ALLOTMENT</u>	<u>% Obligation</u>	<u>% Disbursement</u>
91C	\$ 90,000	99	97
S04	90,000	99	91
S10	273,000	99	96
835	825,000	90	86
875	605,000	96	88
871	343,000	99	78
874	672,000	93	90
878	826,000	90	59
836	282,000	97	93
993	121,000	96	92
832	498,000	99	90
M22	126,000	68	51
M32	<u>260,800</u>	<u>100</u>	<u>3</u>
TOTAL DIRECT	\$5,011,800	94	78
REIMBURSABLES	<u>549,944</u>	<u>61</u>	<u>56</u>
TOTAL FUNDS AVAILABLE	\$5,561,744	91	76

COMPARISON FY82 to FY83:

	<u>ALLOTMENT</u>	<u>% Obligation</u>	<u>% Disbursement</u>
FY82	\$5,166,188	93	78
FY83	\$5,561,744	91	76



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BY: [illegible]

APPROVED: [illegible]

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IN-HOUSE LABORATORY INDEPENDENT RESEARCH

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^b	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^c	6. WORK SECURITY ^d	7. REGRADING ^e	8a. DISSEM INSTR ^f	8b. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
82 10 01	H. TERMINATION	U	U		NL		
10. NO./CODES ^g		PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY		61101A	3A161101A91C	00		065 APC F176	
b. CONTRIBUTING							
c. CONTRIBUTING		None					
11. TITLE (Precede with Security Classification Code) ^h							
(U) Fate of Chlorine in the Presence of UV Light							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ⁱ							
008300 Inorganic Chemistry; 007800 Hygiene and Sanitation							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS	
b. NUMBER ^j :				FISCAL YEAR		sub-awards)	
c. TYPE:				83		0.1	
d. KIND OF AWARD:				CURRENT		1	
e. AMOUNT:				84		0.0	
f. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^k : US Army Medical Bioengineering Research & Development Laboratory				NAME ^k : US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^k : Fort Detrick, Frederick, MD 21701				ADDRESS ^k : Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME ^k : Hoke, S H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Chlorine; (U) Degradation; (U) Photolysis; (U) Inorganic Chemistry							
23. TECHNICAL OBJECTIVE ^l , 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Most of the water the Army consumes is chlorinated. Also, the water from Army wastewater treatment plants is chlorinated before it is returned to the environment. Because chlorinated Army water is exposed to UV light, we need to know the fate of chlorine.</p> <p>24. (U) We will conduct a literature search and consult with knowledgeable researchers in this area of interest. Then we will study the photodegradation of chlorine at different pH and attempt to identify the reaction products and intermediates. The ion chromatograph will be used to identify some of the reaction products.</p> <p>25. (U) 8210 - 8309. Degradation curves of chlorine and formation curves of oxygen have been constructed. From these curves and from indications in the literature, additional reaction products besides oxygen and chloride ion are formed. Degradation curves for chlorine and formation curves for oxygen have been constructed.</p>							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Fate of Chlorine in the Presence of UV Light

FUNDING HISTORY: PY - 12K; CY - 1K; BY - OK

PROBLEM DEFINITION: Chlorination of drinking water and of effluents from wastewater treatment plants is standard practice employed by the US Army and the private sector. Because this water is exposed to UV light, the fate of chlorine needs to be determined.

IMPORTANCE: This research was not successful because the principal investigator became involved with core funded research and could not devote the necessary time to the study. Because of similar PI constraints in FY84, the project was terminated.

APPROACH: The objective was to study the photodegradation of chlorine at different pHs and to attempt to identify the reaction products and intermediates. Bottles containing dissolved chlorine in water at different pH was placed under a UV light. Samples were removed periodically and analyzed for possible oxygenated chlorine intermediates and products such as chloride ion and oxygen. The ion chromatograph, chlorine titrator, ion selective electrodes, and associated equipment were used to conduct the analyses.

ACHIEVEMENTS: Little progress has been accomplished on this project due to shortage of qualified manpower and time constraints.

PUBLICATION: A paper is being prepared for journal publication which shows the degradation of chlorine and the increase of oxygen.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY 82 10 01	4. KIND OF SUMMARY H. TERMINATION U	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISB'N INSTR'M NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		61101A		3A161101A91C		00 066 APC F174	
b. CONTRIBUTING							
c. CONTRIBUTING		None					
11. TITLE (Precede with Security Classification Code) ^a (U) Silver Chloride Photovoltaic Cell							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 000450 Conversion Techniques; 008300 Inorganic Chemistry							
13. START DATE 80 07		14. ESTIMATED COMPLETION DATE 83 09		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83 0.1 1	
c. TYPE:				CURRENT		84 0.0 0	
d. AMOUNT:							
e. KIND OF AWARD:				f. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Trudeau, T L TELEPHONE: (301) 663-7685				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: ^a Hoke, S H TELEPHONE: (301) 663-2036 SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS NAME: NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Photocell; (U) Solar Cell; (U) Photovoltaic; (U) Silver Chloride							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) To determine whether or not a photocell can be constructed using silver chloride to produce electricity from light. This photovoltaic cell could provide a "silent" source of power to operate electronic monitoring instrumentation at remote military sites.</p> <p>24. (U) Initially a literature search will be conducted. Then a photocell will be designed and constructed. Parameters will be varied in order to determine the optimum conditions for converting sunlight to electricity.</p> <p>25. (U) 8210 - 8309. A literature search conducted during FY81 indicated no research activity on this type of photocell. Materials and chemicals have been ordered and assembled. A preliminary cell has been designed. This cell has demonstrated that electricity can be produced from sunlight using AgCl; however, the amount of electricity produced is very small. Further research on this cell at this time does not appear feasible.</p>							

DETAIL SHEET

TITLE: (U) Silver Chloride Photovoltaic Cell

FUNDING HISTORY: PY - 5K; CY - 1K; BY - OK

PROBLEM DEFINITION: To determine whether or not a photocell can be constructed using silver chloride to produce electricity from light. This photovoltaic cell could provide a "silent" source of power to operate electronic monitoring instrumentation at remote military sites.

IMPORTANCE: This research was undertaken by the principal investigator as a result of previous research experience in the Department of Energy. Results indicate that the project should be terminated because the process does not appear to be economically feasible.

APPROACH: The objective was to design a photovoltaic cell from silver chloride and determine the optimum conditions for operation. Using various cell designs, several parameters such as pH, chlorine concentration, light intensity, and wavelength are being studied. This photocell could provide an economic source of electrical energy to remote installations and would prove valuable to both the military and private sectors.

ACHIEVEMENTS: By using various cell solution compositions and cell designs, optimum conditions for the photocell were obtained; however, the output from the cell was of such small magnitude that the photocell does not show promise for economic feasibility.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)6J6	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	H. TERMINATION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY		61101A	3A161101A91C	00		069 APC F180	
b. CONTRIBUTING							
c. CONTRIBUTING		None					
11. TITLE (Precede with Security Classification Code) ^a (U) Feasibility of Using NMR-31P and Flow Injection Analyses to Characterize Chemistry of Phosphorus Smokes							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 012100 Organic Chemistry; 008300 Inorganic Chemistry; 012700 Physical Chemistry; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		c. FUNDS (in thousands)	
c. TYPE:				83		0.1	
d. KIND OF AWARD:				84		0.0	
e. CUM. AMT.						0	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Wade, C W R			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Smokes; (U) Phosphorus; (U) Characterization; (U) NMR-31P; (U) Flow Injection Analysis							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) The objective of this work is to determine the feasibility of using flow injection analysis/high performance liquid chromatography (FIA/HPLC) and nuclear magnetic resonance spectroscopy-phosphorus-31 (NMR-31P) for rapid analyses of phosphorus aerosols, Army smokes used to screen soldiers and equipment. Current analytical procedures require several hours to days to complete chemical characterization.</p> <p>24. (U) The primary combustion product of white and red phosphorus is phosphorus pentoxide. Vapors of the pentoxide will be hydrolyzed and examined with NMR-31P and flow injection analyses. The data will be compared with data collected from TLC, HPLC, ion chromatography, and GC/MS studies. Similarly, combustion products from white phosphorus felt and red phosphorus/butyl rubber will be hydrolyzed in the vapor phase and analyzed. Attention will focus on trace levels of detection, difficulty of analyses, quality of collected data, and total characterization. Findings will be provided to in-house, extramural, and other inhalation and toxicological studies.</p> <p>25. (U) 8210 - 8309. This concept was shared with analytical chemistry personnel at the Oak Ridge National Laboratory, Oak Ridge, TN, who were contractually doing inhalation studies for this Laboratory under Army Project No. 2802. They used high performance liquid chromatography to separate the phosphoric acid components in the mixture and identified each peak by flow injection analysis using molybdate. Phosphoric acids from mono- to octa-polyphosphoric were separated, identified and quantitated. These results show the feasibility of this approach and its expediency.</p>							

DETAIL SHEET

TITLE: (U) Feasibility of Using NMR-31P and Flow Injection Analyses to Characterize Chemistry of Phosphorus Smokes

FUNDING HISTORY: PY - 7K; CY - 1K; BY - OK

PROBLEM DEFINITION: Army smokes and obscurants are used in training and to screen the combat soldier and military equipment. Definitive inhalation studies on the toxicology of the chemicals and their combustion products in these obscurants dictate a need for rapid, turn around analyses. The objective of this work is to determine the feasibility of using flow injection analysis/high performance liquid chromatography (FIA/HPLC) and phosphorus 31-nuclear magnetic resonance spectroscopy (P-31-NMR) for rapid, quantitative analyses of the species of phosphorus produced during combustion of smoke composition.

IMPORTANCE: Army smokes are used to train and screen the combat soldier. As a result, the soldier may inhale large quantities of the combustion products which may have acute and chronic toxicologic properties. Animal studies on the properties of these substances are long and when further delayed by time-consuming and time-extending analyses, the evaluative process may be jeopardized. Consequently, the rapid repetition or redesign of an experiment is delayed. Rapid, quantitative and qualitative methods of analyses will provide data before an inhalation exposure has been completed. Investigators should be able to respond more quickly to anomalous data.

APPROACH: Vapors of the combustion of red and white phosphorus will dissolve in water and the solution will be examined qualitatively using NMR and quantitatively using FIA/HPLC. The data will be compared with data obtained from HPLC, TLC, and ion chromatography on the same samples. Attention will focus on the trace levels of phosphorus species.

ACHIEVEMENTS: This concept was shared with the analytical chemistry personnel at the Oak Ridge National Laboratory, who were contracturally doing inhalation studies for this Laboratory under Army Project No. 2802. They developed and used the FIA/HPLC technique and rapidly separated and identified phosphoric acid species from orthophosphoric to octapolyphosphoric acids. These results show the feasibility of the approach and no further work is planned on this concept.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY					1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISSEM INSTR ^a	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT	
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61101A	3A161101A91C		00	318 APC F166			
b. CONTRIBUTING								
c. CONTRIBUTING	None							
11. TITLE (Precede with Security Classification Code) ^a (U) Development of an Automated Toxicant Screening Test Based on the Ventilatory Responses of Fish								
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 005900 Environmental Biology; 016800 Toxicology; 012900 Physiology								
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD		
79 10		84 09		DA		C. In-House		
17. CONTRACT, GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS		b. FUNDS (in thousands)
a. DATES/EFFECTIVE:				PRECEDING				
b. NUMBER: ^a				FISCAL YEAR		83		0.1
c. TYPE:				CURRENCY				5
d. KIND OF AWARD:						84		0.2
e. CUM. AMT.								20
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION				
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701				
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic (not fulltime))				
NAME: Trudeau, T L				NAME: ^a van der Schalie, W H				
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7627				
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:				
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS				
				NAME:				
				NAME:				
				POC:DA				
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Lab Animals; (U) Fish; (U) Toxicants; (U) Automated; (U) Ventilatory; (U) Rainbow Trout								
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)								
23. (U) Evaluation of a screening test designed to estimate the chronic toxicity of materials to fish by a technique requiring considerably less time and expense than currently available methods. The test will be used in conjunction with a program to assess the environmental hazards associated with Army-relevant materials.								
24. (U) A microcomputer-based system will be used to monitor the ventilatory patterns of 30 fish exposed in groups of five to a series of toxicant concentrations. The lowest concentration affecting the ventilatory patterns will be compared to literature values for the lowest concentration of the same toxicant affecting fish survival, growth or reproduction during long-term exposure. The ability of the ventilatory monitoring system to predict chronic toxic effect levels will then be determined.								
25. (U) 8210 - 8309. A ventilatory screening test conducted with bluegills (<u>Lepomis macrochirus</u>) and chlordane did not show a good correlation between ventilatory response and chronic toxicity levels. Preliminary evaluation of rainbow trout indicated a good potential for their use in the monitoring system.								

DETAIL SHEET

TITLE: (U) Development of an Automated Toxicant Screening Test Based on the Ventilatory Responses of Fish

FUNDING HISTORY: PY - 6K; CY - 5K; BY - 20K

PROBLEM DEFINITION: The objective of this project is to determine if a short-term test which detects toxicant-related ventilatory abnormalities in rainbow trout can be used as a screening tool for evaluating the chronic toxicity of Army-relevant materials.

IMPORTANCE: Recent published reports have indicated a relationship between the lowest concentrations of a toxicant causing chronic effects on fish growth, reproduction, or survival and the concentrations causing abnormal fish ventilatory patterns. An automated toxicity screening system which could use this relationship to help predict the chronic toxicity of Army-relevant materials to fish could significantly reduce the cost of generating environmental data bases for aquatic organisms.

APPROACH: Construct new exposure chambers and modify computer software to adapt an existing ventilatory monitoring system for bluegills to rainbow trout. Evaluate the capacity of the system for predicting chronic toxicity levels by monitoring the ventilatory patterns of rainbow trout exposed for several days to Army-relevant materials (e.g., 2,4-dinitrotoluene) for which the chronic toxicity to rainbow trout has been determined.

ACHIEVEMENTS: The automated screening system developed during this project can monitor the ventilatory patterns of up to 30 fish simultaneously. The sensitivity of the system was tested by monitoring the effects of sublethal concentrations of chlordane on bluegills in a 6-day test. No changes in ventilatory parameters were detected at chlordane concentrations up to seven times the chronic toxicity threshold reported in the literature. Based on this study, the screening system does not seem sensitive enough to allow predictions of chronic toxicity based on the ventilatory responses of bluegills.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY					1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY 32 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8a. DISB'N INSTR'N NL	8b. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT	
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61101A	3A161101A91C		00	319 APC F155			
b. CONTRIBUTING								
c. CONTRIBUTING	None							
11. TITLE (Precede with Security Classification Code) ^a (U) Formation and Evaluation of Specific Adsorbents for Removal of Waste Pesticides, Poisons and Toxins from Water								
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 007800 Hygiene and Sanitation; 008000 Industrial Processes; 012100 Organic Chemistry								
13. START DATE 82 10		14. ESTIMATED COMPLETION DATE 84 09		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House		
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS		b. FUNDS (in thousands)
a. DATES/EFFECTIVE:				PRECEDING				
b. NUMBER: ^a				FISCAL YEAR		83		0.2
c. TYPE:				CURRENT		84		0.3
d. KIND OF AWARD:								20
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION				
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				
RESPONSIBLE INDIVIDUAL NAME: Trudeau, T L TELEPHONE: (301) 663-7685				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: ^a Kulkarni, R K TELEPHONE: (301) 663-2036 SOCIAL SECURITY ACCOUNT NUMBER:				
21. GENERAL USE Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS NAME: NAME:				
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Adsorption; (U) Pesticides; (U) Dyes; (U) Toxins; (U) Mechanism; (U) Wastewater; (U) Hazardous Waste; (U) Environmental Pollutant				23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)				
<p>23. (U) Earlier unpublished research at this Laboratory demonstrated that specific adsorbents for chlordane, malathion, and sulfone (p-Cl phenyl methyl) could be made from silica gels. It is expected that specific adsorbents made from organic polymers, rather than silica gels, would be cheaper and more efficient. It is the objective of this research to investigate the production of specific adsorbents for pollutants or chemical or biological agents using organic polymers as reported in the literature.</p> <p>24. (U) Two approaches will be used: already available polymers will be crosslinked in the presence of the adsorbates and tested for specificity; organic monomers, containing covalently-bound adsorbates, will be synthesized and polymerized; and crosslinked adsorbates will be chemically removed and tested for specificity. Chlordane, malathion, trichothecenes, and surrogate chemical agents will be tested both as pure compounds and as mixtures containing other nonspecific chemicals.</p> <p>25. (U) 8210 - 8309. The selectivity of silica gel adsorbents for methyl orange/ethyl orange and chlordane/malathion was studied using the HPLC technique with mixed solutions of these adsorbates in the paired combinations indicated. Selectivity in the mixtures was unimpaired.</p>								

DETAIL SHEET

TITLE: (U) Formation and Evaluation of Specific Adsorbents for Removal of Waste Pesticides, Poisons and Toxins from Water

FUNDING HISTORY: PY - 0K; CY - 8K; BY - 20K

PROBLEM DEFINITION: The polymerization of orthosilicic acid sol to gel in the presence of the dyes methyl, ethyl, propyl, and butyl orange, studied by Dickey, showed that the prepared gels exhibited specific adsorptivity several times that of normal silica gel for the template dyes. The restructuring of serum globulin in the presence of methyl blue, and polymerization of acrylate monomers in the presence of rhodanile blue or safranin O, produced new polymers having extra affinity for the template molecules mentioned. This phenomenon suggests that enhanced sorbability through rearrangement of secondary valence forces of a polymeric chain during polymerization may be brought about by the presence of template molecules. In particular, pollutants could be specifically removed from wastewater by such polymers.

IMPORTANCE: The adjustment of the sorbability has many wide applications such as: separation of toxic from nontoxic components, purification of drinking and hospital service water, and removal of chemical agents from water.

APPROACH: First, the sorbents will be prepared from polymerization of selected monomeric systems in the presence of substances exactly similar in chemical structure to the ones to which a specificity is desired and test out the adsorbents by the technique of HPLC vs. spectrophotometry in solutions of pure or mixed compounds.

ACHIEVEMENTS: It was shown that specific adsorbents can be made from silica gel for chlordane, malathion, and chlorophenyl-methyl sulfone.

PUBLICATIONS/PRESENTATIONS: Kulkarni, R.K. and T.M. Trybus. January 1983. Preparation of Specific Selective Adsorbents for Pollutants in Wastewater. Research Newsletter, No. 7, page 7, USAMRDC.

Kulkarni, R.K. and T.M. Trybus. August 1983. Specific Adsorbents for Wastewater Pollutants. Paper presented at the 186th Annual Meeting of ACS, Environmental Division, Washington, DC. ACS Preprints Vol. 23, No. 2.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	H. TERMINATION U		U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61101A	3A161101A91C	00	320 APC F156			
b. CONTRIBUTING							
c. CONTRIBUTING	None						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Quantitative Analysis of Trichothecenes in Dilute Aqueous Solutions							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
012100 Organic Chemistry; 007800 Hygiene and Sanitation							
13. START DATE	14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY	16. PERFORMANCE METHOD			
82 10	83 09		DA	C. In-House			
17. CONTRACT/GRANT			18. RESOURCES ESTIMATE				
a. DATES/EFFECTIVE:			a. PROFESSIONAL MAN YRS				
b. NUMBER: ^a			b. FUNDS (in thousands)				
c. TYPE:			c. CUM. AMT.				
d. KIND OF AWARD:			d. CUM. AMT.				
19. RESPONSIBLE DOD ORGANIZATION			20. PERFORMING ORGANIZATION				
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				
ADDRESS: ^a Fort Detrick, Frederick, MD 21701			ADDRESS: ^a Fort Detrick, Frederick, MD 21701				
RESPONSIBLE INDIVIDUAL			PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)				
NAME: Trudeau, T L			NAME: ^a Burrows, E P				
TELEPHONE: (301) 663-7685			TELEPHONE: (301) 663-2036				
21. GENERAL USE			SOCIAL SECURITY ACCOUNT NUMBER:				
Foreign Intelligence Not Applicable			ASSOCIATE INVESTIGATORS				
			NAME:				
			NAME:				
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Trichothecenes; (U) Sep-Pak C-18 Cartridge; (U) GC/MS; (U) T-2 Toxins							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To work out in the laboratory a method of quantitative analysis specific for low levels of trichothecenes in field water samples.							
24. (U) The usefulness of Sep-Pak C-18 cartridges in adsorbing organophosphorus pesticides from water solutions at levels as low as 5 ppb has been demonstrated previously in this Laboratory. Trichothecenes are also highly polar molecules of medium MW, and should be similarly adsorbed and readily eluted with methanol. The methanol eluates, after evaporation to dryness and derivatization, will be analyzed quantitatively by EI or CI GC/MS monitoring of selected ions highly specific for each trichothecene analysis (detection limit 1-5 ng for EI, lower for CI). Thus, 100 mL of solutions as dilute as 0.1 ppb (10 ng/100 mL) in trichothecene should be readily analyzed. The use of such a sophisticated analytical method as GC/MS would be feasible for field sampling provided that the Sep-Pak cartridges with the adsorbed samples could be quickly sent to a central location for analysis.							
25. (U) 8210 - 8309. Sub ppb levels of T-2 and HT-2 were analyzed quantitatively using SIM in both EI and CI modes. When funds became available the project was transferred to the core program.							

DETAIL SHEET

TITLE: (U) Quantitative Analysis of Trichothecenes in Dilute Aqueous Solutions

FUNDING HISTORY: PY - OK; CY - 1K; BY - OK

PROBLEM DEFINITION: While a number of procedures for extraction, separation, and quantitative analysis of trichothecenes in grain and other foodstuffs have been published, detection and quantitation of these toxins at trace levels in water has not been addressed. An analytical procedure for their specific assessment in water samples would be valuable any time deployment of trichothecenes as chemical warfare agents is suspected.

IMPORTANCE: Throughout the 1970s, there has been increasing concern over the presence of certain members of the 12,13-epoxytrichothecene class of mycotoxins as naturally occurring fungal metabolites in human and animal foodstuffs, and more recently there has been evidence implicating their use as chemical warfare agents in southeast Asia.

APPROACH: Development of a methodology involving concentration of trace organics by Sep-Pak C-18 cartridges followed by quantitative identification by GC/MS was proposed. The use of such a sophisticated analytical method would be feasible for field sampling provided that the Sep-Pak cartridges with the adsorbed samples could be quickly sent to a central location for analysis.

ACHIEVEMENTS: Sub ppb levels of T-2 and HT-2 were analyzed quantitatively using SIM in both EI and CI modes. When funds became available this project was transferred to the Laboratory's core program in mycotoxin detection research.

PRESENTATION: "Analytical Chemical Methods Development for Trichothecenes," presented by E.P. Burrows at DOD Toxin Defense Coordination Meeting, Aberdeen Proving Ground, March 1983.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA- CONTRACTOR ACCESS ^a	8. LEVEL OF SUM ^a
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61101A	3A161101A91C	00	322 APC F157			
b. CONTRIBUTING							
c. CONTRIBUTING	None						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Microbial Degradation of 2,4,6-Trichloroaniline							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 002300 Biochemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 10		83 09		DAI		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE:				83		0.4	
d. KIND OF AWARD:				CURRENT		28	
e. AMOUNT:				84		0.0	
f. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Mitchell, W R			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2538			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) 2,4,6-Trichloroaniline; (U) Biodegradation; (U) Bacterial; (U) Kinetics							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Previous studies have indicated that aquatic sediments from Aberdeen Proving Ground (APG) are contaminated with 2,4,6-trichloroaniline (2,4,6-TCA), an Army pollutant. Chemical fate studies conducted at USAMBRDL have indicated that the compound is not present and preliminary microbiological results indicate that it is biodegradable.</p> <p>24. (U) Studies will be conducted to determine if 2,4,6-TCA is ultimately biodegraded to carbon dioxide by a mixed culture of microorganisms isolated at APG. Additional studies will be conducted to demonstrate if increases of biomass in response to the compound can be measured by increased cell numbers or cellular constituents. Various sites will be analyzed for the presence of 2,4,6-TCA degrading microbes.</p> <p>25. (U) 8210 - 8309. A closed system has been developed which has permitted the completion of microbiological studies without interference due to the volatility of 2,4,6-TCA. The compound is biodegradable by organisms obtained from the Canal Creek Tributary to the Gunpowder River, and the organisms will quantitatively remove chlorine atoms from 2,4,6-TCA, mineralize the compound, and grow on it as a sole carbon source. Rate constants have been calculated for biodegradation in natural water samples and laboratory cultures. Similar enrichment cultures could not be developed from local water sources.</p>							

DETAIL SHEET

TITLE: (U) Microbial Degradation of 2,4,6-Trichloroaniline

FUNDING HISTORY: PY - OK; CY - 28K; BY - OK

PROBLEM DEFINITION: The demonstration that 2,4,6-TCA is biodegradable will support conclusions drawn at this Laboratory that the compound will not persist in environmental waters.

IMPORTANCE: Previous studies have indicated that aquatic sediments taken from the Gunpowder River, adjacent to the Aberdeen Proving Ground, MD (APG), are contaminated with 2,4,6-TCA. Chemical studies undertaken at USAMBRDL have suggested that the compound is not present in the sediments, but rather, they are contaminated with N,N'-bis (trichlorophenyl) urea which pyrolyses to 2,4,6-TCA during analysis. The lability to photolysis and the volatility of the compound support the contention that it is not present in environmental samples. Moreover, results of microbiological studies with organisms from APG indicated that the compound was biodegradable and would serve as a growth substrate.

APPROACH: The study was to unequivocally demonstrate that 2,4,6-trichloroaniline (2,4,6-TCA) is biodegradable; to determine if biodegradation can be generalized to a diversity of environmental sites; to identify the microorganisms in a previously established culture which appears to grow on 2,4,6-TCA; and to elucidate the means by which the compound is biodegraded.

ACHIEVEMENTS: The project is complete and most of the objectives defined above have been achieved. An all glass closed system has been developed which has permitted us to conduct microbiological studies without interference due to the volatility of 2,4,6-TCA. We have demonstrated that the compound is biodegradable by organisms obtained from the Canal Creek tributary to the Gunpowder River and that these organisms will quantitatively remove chlorine atoms from 2,4,6-TCA, mineralize the compound, and grow on it as a sole carbon source. We have measured the rate at which Canal Creek microorganisms degrade the compound in natural water samples and in laboratory cultures. Similar enrichment cultures have not been developed either from the Gunpowder River or from local water samples. Taxonomical data from the biodegrading culture have been obtained.

PUBLICATION: Mitchell, W.R., S.H. Hoke, and A.B. Rosencrance. Draft. Microbial Degradation of 2,4,6-Trichloroaniline in Aquatic Samples and Laboratory Enrichment Cultures. Technical Report.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA 301046	83 10 01	DD-DR&E(AK)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	9. LEVEL OF SUM	
82 10 01	D. CHANGE	U	U		NL	A. WORK UNIT	
10. NO./CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		61101A		3A161101A91C		00	
B. CONTRIBUTING						323 APC F158	
C. CONTRIBUTING		None					
11. TITLE (Precede with Security Classification Code) ^a (U) Feasibility of Using an Anticholinesterase-Sensitive Unicell in Detection of Trace-Level Chemical Agents							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 003200 Chemical, Biological, and Radiological Warfare; 010100 Microbiology; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 10		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING		B. FUNDS (In thousands)	
B. NUMBER: ^a				FISCAL YEAR		0.1	
C. TYPE:		D. AMOUNT:		CURRENT		6	
E. KIND OF AWARD:		F. CUM. AMT.		84		0.1	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Bausum, H T			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7207			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Anticholinesterase Agents; (U) Chemical Defense; (U) Bioassay; (U) Yeast							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Using a choline-requiring yeast, to develop a system in which growth of the organism is dependent on the activity of a cholinesterase. To characterize this cholinesterase-dependent growth response as to its sensitivity to inhibitors such as parathion, to determine response times, using various methods of measuring growth. The effect of presently undetected trace levels of chemical agents on soldier health and effectiveness is not known. Biodetection holds promise of offering a complementary test modality in which results might require several hours but reflect increased sensitivity for trace-level detection.</p> <p>24. (U) Choline-requiring mutant strains of the yeast <u>Saccharomyces cerevisiae</u> showing zero growth without choline will be obtained and their response to acetylcholine determined. If they are unable to use this or another choline ester for growth, an animal cholinesterase will be supplied. Once a system has been established in which growth is dependent on an added choline ester, the capacity of anticholinesterase compounds to suppress or prevent growth will be investigated. The levels of various organophosphorus substances detectable by this means will be determined as well as time required for detection. Use of a noncholine-requiring strain in parallel with test strains will enhance sensitivity and afford control. Various means of measuring growth (turbidimetric, chemical, viable numbers) will be explored.</p> <p>25. (U) 8210 - 8309. Initiation of research was delayed awaiting negotiation for, and receipt of, necessary yeast strains. Literature study and receipt of supplies were completed.</p>							

DETAIL SHEET

TITLE: (U) Feasibility of Using an Anticholinesterase-Sensitive Unicell in Detection of Trace-Level Chemical Agents

FUNDING HISTORY: PY - OK; CY - 6K; BY - 10K

PROBLEM DEFINITION: To ascertain whether yeast mutant strains requiring choline for growth can obtain it from acetylcholine or other choline ester as sole choline source, thereby indicating, under these conditions, a dependency on an endogenous cholinesterase for growth. If endogenous enzyme is not in evidence, to supply an animal cholinesterase. To determine the sensitivity of this cholinesterase-dependent growth response to various cholinesterase inhibitors, such as parathion and certain other pesticides. To determine response times, using turbidimetric, chemical, and other methods of visualizing the growth response.

IMPORTANCE: The Army's test kit XM272 is capable of detecting G agents at levels of 0.02 mg/L. It is not known whether lower levels of these agents in natural and potable waters can produce subacute or chronic effects or impair soldier effectiveness. Biodetection holds promise of offering a complementary test modality in which results require several hours, but reflect increased sensitivity for trace-level detection.

APPROACH: Choline-requiring mutant strains of the yeast Saccharomyces cerevisiae showing zero growth without choline will be obtained from another laboratory (University of California). The response of these to acetylcholine will be determined. If they are unable to use this or another choline ester for growth, an animal cholinesterase (eel or horse) will be supplied. Once a system has been established in which growth is dependent on an added choline ester, the capacity of anticholinesterase compounds to suppress or prevent growth will be investigated. The levels of various organophosphorus substances detectable by this means will be determined as well as time required for detection. Growth of the organism will be visualized in one or more ways: turbidimetrically, chemically (colorimetrically), or by plating and micro-colony count. A non-choline requiring strain will be used in parallel with the mutant strain to enhance sensitivity of the test and to help distinguish toxic or other adverse responses unrelated to organophosphorus substances.

ACHIEVEMENTS: Initiation of research was delayed awaiting negotiation for, and receipt of, necessary yeast strains. Literature study and receipt of supplies were completed.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR) 1616	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		61101A		3A161101A91C		00	
B. CONTRIBUTING						324 APC F172	
C. CONTRIBUTING		None					
11. TITLE (Precede with Security Classification Code) ^a (U) Evaluation of the Effect of an Antifoam Addition to Beef Extract Eluent on the Recovery of Enteroviruses from Water and Wastewater							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 005900 Environmental Biology; 010100 Microbiology; 007800 Hygiene and Sanitation							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 10		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL		83	
C. TYPE:				CURRENT		0.1	
D. KIND OF AWARD:				84		0.1	
E. CUM. AMT.						5	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Taylor, G W			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2340			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Virus; (U) Antifoam; (U) Environmental Waters; (U) Detection							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To evaluate the effect of an antifoam additive to beef extract eluent on the recovery of enteroviruses from water and wastewater. This work will provide improved capability for virus assay in current microbiological evaluations of the Army's new technology field water treatment systems (reverse osmosis water purification units).							
24. (U) The Bentonite system for virus recovery will be compared with the new charge-modified filters (IMDS filter from AMF-CUNO and the NKZ nylon filter from PALL) with environmental waters of higher humic acid content, e.g., wastewater.							
25. (U) 8210 - 8309. Replicate results with the AMF-CUNO charged filters (IMDS) gave excellent recovery of poliovirus from tapwater when compared to the Bentonite Virus Concentration. Approximately 10 percent of the virus was recovered in the filtrates. Reduced recovery of the virus was found using the PALL nylon NKZ filter with 20 percent of the seeded virus recovered in the filtrate. Variation between replicate samples was reduced by rinsing the Hydrosol filter holder in a small volume of 70 percent isopropanol prior to the second filtration.							

DETAIL SHEET

TITLE: (U) Evaluation of the Effect of an Antifoam Addition to Beef Extract Eluent on the Recovery of Enteroviruses from Water and Wastewater

FUNDING HISTORY: PY - 1K; CY - 2K; BY - 5K

PROBLEM DEFINITION: Enteroviruses are removed and concentrated from environmental waters using various filtration methodologies, the most universal of which appears to be the Bentonite method. Once the viruses are trapped on a filter, they are recovered with a high pH, organic eluent. The addition of antifoam B enhances their recovery.

IMPORTANCE: The technique will improve virus detection methods in evaluating water purification units. Only a tentative method is listed in the latest Standard Methods 15th Ed.

APPROACH: The Bentonite system for enterovirus recovery will be compared with the new charge-modified filters (IMDS filter from AMF-CUNO and the NKZ nylon filter from PALL) with environmental waters of higher humic acid content, e.g., wastewater, pond water.

ACHIEVEMENTS: Replicate results with the AMF-CUNO charged filters (IMDS) gave excellent recovery of poliovirus from tapwater when compared to the Bentonite Virus Concentration. Approximately 10 percent of the virus was recovered in the filtrates. Reduced recovery of the virus was found using the PALL nylon NKZ filter with 20 percent of the seeded virus recovered in the filtrate.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
82 10 01	K. COMPLETION	U	U		NL		
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61101A	3A161101A91C	00	325 APC F159			
b. CONTRIBUTING							
c. CONTRIBUTING	None						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Automated Anion Stripping							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
008300 Inorganic Chemistry; 012700 Physical Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE:				83		0.1	
d. KIND OF AWARD:				CURRENT		8	
e. CUM. AMT.				84		0.0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Hoke, S H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Ion Chromatography; (U) Trace Analysis; (U) Chromatography; (U) Inorganic Analysis							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a technique for determining ppb levels of anions in the presence of a large excess of other anions by ion chromatography.							
24. (U) A concentrator (stripper) column will be placed in the sample line between the automatic sampler and the ion chromatograph. As sample is pumped through this concentrator column, background ions, which must have a greater affinity for the resin than the ion of interest, are stripped from it. When this column becomes saturated with sample ions the ion of interest will "spill over" onto a second concentrator column located in the sample loop of the ion chromatograph. The ion of interest can now be chromatographed with minimal interference from the background ions.							
25. (U) 8210 - 8309. This anion stripping technique has been used successfully to monitor the appearance of chloride ion in a basal salt medium which resulted from the microbial degradation of trichloroaniline. This work, in conjunction with some other related work, will be published in a technical report.							

DETAIL SHEET

TITLE: (U) Automated Anion Stripping

FUNDING HISTORY: PY - OK; CY - 8K; BY - OK

PROBLEM DEFINITION: No ion chromatography technique is available to determine ppb levels of anions in the presence of a large excess of other anions. The development of such a method has direct application to the low level determination of biodegradation products in the presence of a background nutrient and potentially in determining toxic agents in the presence of interfering ions.

IMPORTANCE: This research resulted in the development of an important analytical method for use by Army laboratories and the civilian sector. The technique was successfully used to monitor chloride in a core funded project on microbial degradation of trichloroaniline.

APPROACH: A concentrator (stripper) column is placed in the sample line between the automatic sampler and the ion chromatograph. As sample is pumped through this concentrator column, background ions, which must have a greater affinity for the resin than the ion of interest, are stripped. When this column becomes saturated with sample ions, the ion of interest will "spill over" onto a second concentrator column located in the sample loop of the ion chromatograph. The ion of interest can then be chromatographed with minimal interference from the background ions.

ACHIEVEMENTS: This anion stripping technique has been used successfully to monitor the appearance of chloride ion in a basal salt medium which resulted from the microbial degradation of trichloroaniline.

PRESENTATION: The technique received many favorable comments when it was recently presented at the International Symposium on Ion Chromatography. This work, in conjunction with some other related work, will be published in a Technical Report.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DES'N INSTR ^a	9a. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
82 10 01	K. COMPLETION	U	U		NL		
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		61101A		3A161101A91C		00	
b. CONTRIBUTING						328 APC F160	
c. CONTRIBUTING		None					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Determination of Phenoxyacid Herbicides by Ion Chromatography							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
012100 Organic Chemistry; 000700 Agricultural Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				b. EXPENDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENCY		0.2	
d. KIND OF AWARD:						3	
e. AMOUNT:				84		0.0	
f. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Hoke, S H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Ion Chromatography; (U) Herbicides; (U) Phenoxyacids; (U) Water Analysis							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop a rapid method for determining organic acid herbicides using ion chromatography.							
24. (U) Samples will be hydrolyzed according to standard procedures and injected directly into the sample loop containing a concentrator column. The herbicides will then be chromatographed using ion chromatography exclusion (ICE).							
25. (U) 8210 - 8309. The ester forms of the herbicides were hydrolyzed at pH 11. The pH was then adjusted to 2 and the acid form of the herbicide was concentrated on a C-8 column using an automated ion chromatographic technique. The herbicides were then chromatographed using a standard ion eluent with 5 percent acetonitrile and fast anion columns. The detection limit for 2,4-D, 2,4,5-T, and silvex was approximately 100 ppb.							

DETAIL SHEET

TITLE: (U) Determination of Phenoxyacid Herbicides by Ion Chromatography

FUNDING HISTORY: PY - OK; CY - 3K; BY - OK

PROBLEM DEFINITION: Fort Detrick has recently drilled numerous monitoring wells for the purpose of monitoring groundwater for herbicides. A rapid, accurate method was needed for screening these wells for the presence of organic acid type herbicides.

IMPORTANCE: This rapid accurate method was used to monitor groundwater for herbicides in the Fort Detrick well system. Since current methods are extremely time consuming, the research resulted in an important analytical method for use by Army laboratories and the civilian sector.

APPROACH: The objective was to develop a rapid method for determining organic acid herbicides using a Model 16 Ion Chromatograph equipped with ion exclusion columns. The sample is hydrolyzed according to standard procedures to form the free acid and is then injected directly into the ion chromatography, where it is concentrated in the sample loop (C-8 column). The herbicides are then chromatographed using ion chromatography exclusion (ICE). The detection limit for 2,4-D, 2,4,5-T, and silvex is approximately 100 ppb.

ACHIEVEMENTS: This method with all required accuracy and precision data will be submitted to USEPA and other agencies as an alternate method of detection for phenoxyacid herbicides.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3. DATE PREV. SUMMRY 32 10 01	4. KIND OF SUMMARY H. TERMINATION	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DISSEM INSTR ^a NL	9. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61101A	3A161101A91C	00	329 APC F162			
b. CONTRIBUTING							
c. CONTRIBUTING	None						
11. TITLE (Precede with Security Classification Code) ^a (U) Preparation of Specific and Selective Adsorbent Polymers for CW Agents in Air and Water							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 007800 Hygiene and Sanitation; 008000 Industrial Process; 012100 Organic Chemistry							
13. START DATE 82 10		14. ESTIMATED COMPLETION DATE 83 09		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		0.1	
c. TYPE:				CURRENT		0	
d. KIND OF AWARD:				84		0.0	
e. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Kulkarni, R K			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Mechanism; (U) Wastewater; (U) CW Agents; (U) Adsorption; (U) GD; (U) Trichothecene							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Recently it has been shown that specific and selective adsorbents can be made from polymers based on silica gels, polyacrylates or polystyrenes. The same concept could be studied further with respect to effect of various other chemical components, isomers, related compounds on the adsorbability.							
24. (U) To carry out the polymerization of selected monomers (either commercially available or synthetically made) in presence of surrogate adsorbates, crosslink the polymers and remove the adsorbates by selective solvent extraction. The polymers are then dried and tested for selective adsorption. Secondly, the monomers containing the adsorbate residues are polymerized in a suitable solvent, crosslinked and used for selective adsorption, after removal of adsorbate molecules by solvolysis.							
25. (U) 8210 - 8309. The literature search for the preparation of the polymers specific and selective for many pesticides and toxic organic compounds has been completed.							

DETAIL SHEET

TITLE: (U) Preparation of Specific and Selective Adsorbent Polymers for
CW Agents in Air and Water

FUNDING HISTORY: PY - OK; CY - OK; BY -OK

PROBLEM DEFINITION: An extensive literature search and investigations conducted in this laboratory indicate that the selective sorbent systems can be built from inorganic or organic polymers, for the chemical agents or toxins used in warfare.

IMPORTANCE: It is important to effectively test and remove these toxic compounds from water before it is used for drinking and clinical operations.

APPROACH: This study pertains to the preparation of sorbents by the bound and free template methods using surrogate toxic agents, which have the same chemical composition but are virtually non-toxic. The methods involve careful selection of surrogates, preparation of polymers and testing them against the agents themselves for analysis and removal. The initial literature search and the protocol for polymer preparation have been prepared. Further funding is required for synthetic work and evaluation.

ACHIEVEMENTS: A literature survey and a protocol was prepared and submitted for consideration.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 11 19	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		61101A		3A161101A91C		00	
b. CONTRIBUTING						330 APC F163	
c. EXTRINSIC		None					
11. TITLE (Precede with Security Classification Code) ^a (U) Effects of <u>Bacillus thuringiensis</u> var. <u>israelensis</u> on a Predator Mosquito, <u>Toxorhynchites amboinensis</u>							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 11		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.1	
d. KIND OF AWARD:						20	
e. CUM. AMT.				84		0.1	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Anderson, L M			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Pierce, P E			
				NAME: Nelson, J H			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Biological Control; (U) Predation; (U) Bti; (U) <u>Toxorhynchites</u> ; (U) <u>Insects</u> ; (U) <u>Mosquitoes</u>							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Ascertain the effects of one biological control agent, <u>Bacillus thuringiensis</u> var. <u>israelensis</u> (Bti) on a predator mosquito species <u>Toxorhynchites amboinensis</u>, which also has potential as a biological control agent for mosquitoes. The integrated pest management (IPM) program is dependent upon basic studies of this nature to provide information about control agents that may be incorporated into the IPM program.</p> <p>24. (U) Using laboratory assays, infect the larvae of <u>T. amboinensis</u> with Bti in both the presence and absence of a prey species of mosquito, <u>Aedes aegypti</u>, to determine the effects of different concentrations of Bti on these mosquitoes.</p> <p>25. (U) 8211 - 8309. Laboratory tests indicated that even though <u>Ae. aegypti</u> is definitely more sensitive to Bti than <u>T. amboinensis</u>, if enough Bti is applied to adequately control <u>Ae. aegypti</u> larvae, this treatment level will have detrimental effects on the <u>T. amboinensis</u> population.</p> <p>The Effect of <u>Bacillus thuringiensis</u> var. <u>israelensis</u> on <u>Toxorhynchites amboinensis</u> and <u>Aedes aegypti</u> Larvae. Presented at the Joint Meeting of the American and Canadian Entomological Societies, 29 November - 3 December 1982.</p>							

DETAIL SHEET

TITLE: (U) Effects of Bacillus thuringiensis var. israelensis on a Predator Mosquito, Toxorhynchites amboinensis

FUNDING HISTORY: PY - 0; CY - 20K; BY - 5K

PROBLEM DEFINITION: A biological control agent, Bacillus thuringiensis var. israelensis (Bti), has been found to be extremely effective in controlling mosquitoes, black flies, and related insects. Another potential biological control agent against pest mosquitoes is a predator mosquito, Toxorhynchites amboinensis. Adults of T. amboinensis do not feed on mammalian blood as do adults of pest mosquitoes, and larvae of T. amboinensis feed mainly on larvae of pest mosquitoes. Research conducted in the recent past has shown that Bti has far less effect on practically all nontarget organisms than any other control agent. However, to date, there is no data on the effect of Bti on the beneficial predator mosquito, T. amboinensis.

IMPORTANCE: Bti has recently been registered by the Environmental Protection Agency and is now being produced commercially. This material has been widely used in many integrated pest management (IPM) programs where pesticide use regulations require minimum negative impact to the environment. Since the military services most likely will use increasing amounts of Bti, it will be vital to know the impact of Bti on all beneficial insects, including predator mosquitoes such as Toxorhynchites.

APPROACH: In the laboratory a typical vector mosquito, Aedes aegypti, will be infected with Bti, which is extremely effective in controlling this mosquito. The infected mosquitoes, in turn, will be offered to the predator mosquito, T. amboinensis, as a food source. The effects of different concentrations of Bti on both species of mosquitoes will be ascertained.

ACHIEVEMENTS: In the past, this project was concerned with the dose/response of Bti to Ae. aegypti and T. amboinensis. The results (in part) were presented at the 1982 Annual Meeting of the Entomological Society of America, Toronto, Canada. A manuscript detailing the results is in preparation. Laboratory tests indicated that even though Ae. aegypti is definitely more sensitive to Bti than T. amboinensis, if enough Bti is applied to adequately control Ae. aegypti larvae, there will be detrimental effects on the T. amboinensis population. For instance, at the 0.4 ppm Bti treatment level, 85 percent of the Ae. aegypti larvae and 40 percent of the T. amboinensis larvae were killed. The results also showed that all of the Ae. aegypti larvae were killed within one day, and no T. amboinensis mortality was observed until after two days. The Bti treatments delayed the pupation of the surviving T. amboinensis larvae. However, the concentration of Bti needed to be increased by at least 20 times to produce similar mortality rates of T. amboinensis larvae if Ae. aegypti larvae were not present.

PUBLICATIONS/PRESENTATIONS:

The Effect of Bacillus thuringiensis var. israelensis on Toxorhynchites amboinensis and Aedes aegypti Larvae. Presented at the Joint Meeting of the American and Canadian Entomological Societies, 29 November - 3 December 1982.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA 301055	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'H INSTR'H	8B. SPECIFIC DATA: CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	61101A	3A161101A91C		00		331 APC F161	
B. CONTRIBUTING							
C. CONTRIBUTING	None						
11. TITLE (Precede with Security Classification Code) ^a (U) Determining the Feasibility of Using Titanium Dioxide Films for Degrading Organics in Sewage and Other Toxic Pollutants							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 008300 Inorganic Chemistry; 007800 Hygiene and Sanitation							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 09		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		6	
C. TYPE:				CURRENT		0.1	
D. KIND OF AWARD:				84		0.1	
E. CUM. AMT.				10			
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Rosencrance, A B			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Hoke, S H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Titanium dioxide; (U) Catalytic Degradation; (U) Water Purification; (U) Photolysis							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) In 1969 an EPA report described the photocatalytic oxidation of dissolved organic substances in water by irradiation of water containing slurries of zinc oxide or titanium dioxide with a sunlamp. Since this report, no other description of this phenomenon has appeared in the literature. This neglect may be due to the lack of practical application at the time of discovery, or that the phenomenon was simply forgotten.</p> <p>The use of sunlight to oxidize organic materials in sewage as a tertiary treatment technique or to degrade toxic pollutants in water has considerable appeal. The process is not energy intensive.</p> <p>24. (U) The approach is to coat a vessel with a thin stationary film of titanium dioxide. This eliminates the need for a slurry which requires stirring, cuts down the penetration of light and requires mechanical collection of the catalyst. Such a coated vessel containing contaminated water will be exposed to sunlight or a sunlamp and the disappearance of the organic substance followed by chemical analysis.</p> <p>25. (U) 8210 - 8309. Attempts at coating a reaction vessel with calcium sulfate/titanium dioxide were unsuccessful. The use of titanium dioxide suspensions do show promise for UV catalyzed degradation. Additional compounds need to be studied and the use of oxidized titanium foil needs to be considered more carefully as a surface catalyst.</p>							

DETAIL SHEET

TITLE: (U) Determining the Feasibility of Using Titanium Dioxide Films for
Degrading Organics in Sewage and Other Toxic Pollutants

FUNDING HISTORY: PY - OK; CY - 6K; BY - 10K

PROBLEM DEFINITION: To investigate means of incorporating titanium dioxide (TiO₂) catalyst into a reaction vessel and to study its effectiveness in degrading various toxic compounds.

IMPORTANCE: The use of a film or slurry with sunlight to oxidize organic materials in sewage as a tertiary treatment technique or to degrade toxic pollutants in water has considerable appeal since the process is not energy dependent.

APPROACH: The approach is to coat a vessel with a thin stationary film of TiO₂. This eliminates the need for a slurry which requires stirring, cuts down the penetration of light and requires mechanical collection of the catalyst. Such a coated vessel containing contaminated water will be exposed to sunlight or a sunlamp and the disappearance of the organic substance followed by chemical analysis.

ACHIEVEMENTS: Attempts at coating a reaction vessel with CaSO₄/TiO₂ were unsuccessful. The use of TiO₂ suspensions do show promise for UV catalyzed degradation. Additional compounds need to be studied and the use of oxidized Ti foil needs to be considered more carefully as a surface catalyst.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
				DA 301048	83 10 01		
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	61101A	3A161101A91C		00		332 APC F154	
B. CONTRIBUTING							
C. CONTRIBUTING	None						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Identification of a 1,3-Dinitrobenzene Biodegrading Microorganism							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 010100 Microbiology; 007800 Hygiene and Sanitation							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 02		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER ^a				FISCAL YEAR		83	
C. TYPE:				CURRENT		0.1	
D. KIND OF AWARD:						2	
E. AMOUNT:				84		0.2	
F. CUM. AMT.						16	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering Research & Development Laboratory				NAME ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^a Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME ^a Mitchell, W R			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Hargett, H T			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Biodegradation; (U) 1,3-Dinitrobenzene; (U) Munitions Pollutant; (U) Mineralization							
23. TECHNICAL OBJECTIVE ^a 24. APPROACH 25. PROGRESS (Furnish individual paragraphs identified by number. Precede last of each with Security Classification Code)							
23. (U) To demonstrate that a microbial isolate will degrade and mineralize the munitions pollutant 1,3-dinitrobenzene and to identify the organism. Following its identification, the organism will be entered in the American Type Culture Collection.							
24. (U) Taxonomical tests including gram and flagellar staining, motility, and biochemical characterization will be used to identify the organism. Growth conditions for the organism will be optimized and its capability to biodegrade 1,3-dinitrobenzene will be documented.							
25. (U) 8210 - 8309. The effect of yeast extract on 1,3-DNB biodegradation has been measured and results indicate that its presence is obligatory for the continued biodegradation on the test chemical. A quantitative hexane extraction for 1,3-DNB analysis has also been developed.							

DETAIL SHEET

TITLE: (U) Identification of a 1,3-Dinitrobenzene Biodegrading Microorganism

FUNDING HISTORY: PY - OK; CY - 2K; BY - 16K

PROBLEM DEFINITION: Nitroaromatic compounds including 1,3-DNB are significant pollutants produced and discharged in association with munitions manufacture. The objective of this project is the characterization and identification of 1,3-DNB degrading microorganism.

IMPORTANCE: Because this organism may be useful in treating munition wastewaters it is imperative to identify the microorganism, to characterize its biodegradation of 1,3-DNB as a pure continuous culture, and to enter it into the American Type Culture Collection.

APPROACH: The microorganism will be identified using standard methods including gram stain, flagellar arrangement, cytochrome oxidase, sugar fermentation and oxidation, and motility. The characterization of its capability to degrade 1,3-DNB will address the following: optimization of yeast extract for biodegradation; a growth curve in response to 1,3-DNB; mineralization of 1,3-DNB; and measurement of the specific growth rate.

ACHIEVEMENTS: The effect of yeast extract on 1,3-DNB biodegradation has been measured and a quantitative hexane extraction for 1,3-DNB has been developed.

PUBLICATIONS/PRESENTATIONS: None.

IDENTIFICATION AND HEALTH EFFECTS OF MILITARY POLLUTANTS

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DSB'S INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	61102A	3E161102BS04		AA	002	APC F202	
b. CONTRIBUTING							
c. COORDINATING	STOG 82/83-6.2/2						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Basic Research in Aquatic Toxicology							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER:				FISCAL YEAR		37	
c. TYPE:				CURRENT		35	
d. KIND OF AWARD:				84		0.4	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: van der Schalie, W H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7627			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Lab Animals; (U) Aquatic Toxicology; (U) Fish; (U) Histopathology; (U) Daphnia magna; (U) RAM III							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To improve the predictive capability of screening tests currently used to evaluate the impact of Army-relevant materials on aquatic organisms.							
24. (U) The histopathologic response of fish to Army-relevant toxicants during early life stage tests will be compared to known chronic effects to see if the predictive ability of the early life stage test can be improved. Compounds to be tested include Dursban and 2,4-dinitrotoluene (2,4-DNT). The effects of similar amounts of 1,3,5-trinitrobenzene (TNB) applied in constant and fluctuating patterns on the invertebrate <u>Daphnia magna</u> will be evaluated to assess the influence of varying toxicant application patterns on toxicity. The use of fish for evaluating the carcinogenic potential of materials will be tested.							
25. (U) 8210 - 8309. A technical report was prepared on the histopathologic effects of 2,4-DNT on fathead minnows. An apparatus to compare constant and fluctuating toxicant effects has been developed and the first test with TNB has been completed. A test evaluating the potential carcinogenic effects of 2,4- and 2,6-DNT in fish is approximately half over.							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Basic Research in Aquatic Toxicology

FUNDING HISTORY: PY - 61K; CY - 37K; BY - 35K

PROBLEM DEFINITION: The primary goals of basic research in aquatic toxicology are to improve the efficiency and predictive capability of existing laboratory test methods and, when necessary, to develop new test methods that may be used for determining the toxicity of Army-relevant materials to aquatic organisms.

IMPORTANCE: The effects of Army-relevant chemicals on aquatic life can be an important part of the data base from which environmental assessments are made. Such assessments are used by regulatory authorities to develop discharge standards which, in turn, may have great impact on Army waste disposal methods. It is therefore of great importance that the laboratory procedures used to estimate potential toxic effects in the field have high predictive capability while keeping time and manpower expenditure to a minimum.

APPROACH: The fish early life stage (ELS) test is commonly used to estimate the chronic toxicity of a material at a fraction of the cost of a full chronic test. Extension of the predictive capability of this test will be investigated by utilizing histopathologic examination of fish at the end of the ELS test. Comparison will be made between traditional ELS end points (survival and growth, histopathologic effects, and effect levels) and full chronic tests. In addition, the relative toxicity of toxicant application patterns will be evaluated by exposing daphnids to equivalent amounts of toxicants applied in constant and fluctuating patterns. The use of increased temperature to reduce the time to tumor induction in a small fish species exposed to a known carcinogen will be investigated.

ACHIEVEMENTS: Fish were exposed to Dursban in an early life stage test and samples were taken for determination of histopathologic effects. An apparatus was constructed to deliver both constant and fluctuating applications of toxicants to aquatic organisms. A preliminary test with 1,3,5-trinitrobenzene and Daphnia magna showed that the constant exposure pattern was more toxic than the fluctuating pattern based on similar total amounts of toxicant applied.

PUBLICATIONS: Broich, S.G. (Draft). Histopathologic Response in the Fathead Minnow (Pimephales promelas) Exposed to 2,4-Dinitrotoluene in an Early Life Stage Toxicity Test. Technical Report. US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3. DATE PREV SUMMARY 82 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTR ^a NL	8B. SPECIFIC DATA CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES ^a		PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY		61102A	3E161102BS04	AA	003	APC F203	
B. CONTRIBUTING							
XXXXXXXXXXXX		STOG 82/83-6.2/2					
11. TITLE (Precede with Security Classification Code) ^a (U) Aquatic Toxicology Test Method Development							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 005900 Environmental Biology; 016800 Toxicology							
13. START DATE 82 10		14. ESTIMATED COMPLETION DATE 84 09		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		83	
C. TYPE:				CURRENT		0.7	
D. AMOUNT:				84		0.4	
E. CUM. AMT.						26	
32							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a van der Schalie, W H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7627			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Lab Animals; (U) Aquatic Toxicology; (U) <u>Daphnia magna</u> ; (U) Chronic Toxicity; (U) Standard Methods; (U) RAM III							
23. TECHNICAL OBJECTIVE ^a , 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To participate in a collaborative effort to develop a standardized static renewal chronic test with the aquatic invertebrate <u>Daphnia magna</u> . This test will be useful for the evaluation of the toxicity of Army-relevant materials to aquatic organisms.							
24. (U) Simultaneous toxicity tests will be conducted in this Laboratory and several others so that the reproducibility of a standard test protocol can be evaluated. Equivalent test materials (both pure compounds and complex mixtures) will be used in each laboratory. In a first phase, this Laboratory will participate with one other to define any areas of the protocol requiring modification. In the second phase, up to 10 laboratories will participate and a final judgment will be made concerning the applicability of the protocol as a standard method for evaluating the toxicity of materials to <u>Daphnia magna</u> .							
25. (U) 8210 - 8309. Several combinations of daphnid food and culture medium were evaluated to determine the best for use in the chronic toxicity testing protocol. The medium recommended was markings and Dawson's reconstituted water, with trout chow and the alga <u>Selenastrum capricornutum</u> for food.							

^a Available to contractors upon originator's approval

DD FORM 1498
1 MAR 68

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A 1 NOV 65
AND 1498-1 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE

U.S. GOVERNMENT PRINTING OFFICE: 1982 - 361-646/8546

DETAIL SHEET

TITLE: (U) Aquatic Toxicology Test Method Development

FUNDING HISTORY: PY - OK; CY - 26K; BY - 32K

PROBLEM DEFINITION: The aquatic invertebrate Daphnia magna is used extensively by the Army and other government and private organizations as a test organism for evaluating the environmental hazard of materials. To date, a standard reproducible chronic toxicity test with this organism has not been developed and validated. This in-house testing project is part of a larger extramural effort to develop such a standardized test protocol.

IMPORTANCE: Accurate evaluation of the possible environmental hazards of Army-related compounds and waste materials is important so that required waste treatment or disposal techniques are neither too expensive nor inadequate for environmental protection. The daphnid chronic test is an important part of many toxicity screening protocols, and the development of a sound test method is vital to the screening process.

APPROACH: The US Environmental Protection Agency is developing a daphnid chronic toxicity test protocol for screening the toxicity of hazardous wastes. This protocol will be evaluated at several laboratories around the country through simultaneous tests with both pure compounds and complex waste mixtures. The toxicity tests conducted in this Laboratory will form part of a data base from which the overall usefulness of the test protocol can be evaluated.

ACHIEVEMENTS: Several different foods and defined culture media were tested at this Laboratory and at EG&G, Bionomics for their ability to support populations of Daphnia magna. One of these food/medium combinations was selected for use in conjunction with the chronic toxicity testing protocol.

PUBLICATIONS: EG&G, Bionomics. 1983. An Assessment of the Suitability of Several Media for Culturing and Testing Daphnia magna. EG&G Bionomics Aquatic Toxicology Laboratory, Wareham, MA. DAMD17-80-C-0011.

PEST MANAGEMENT SCIENCE BASE

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG5997	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DES'N INSTR'N	9. SPECIFIC DATA - CONTRACTOR ACCESS	10. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	61102A	3M161102BST0		AS		331 APC P251	
b. CONTRIBUTING							
c. CONTRIBUTING	STOG 82/83-6.2/3						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pest Management Science Base							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002600 Biology; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
80 12		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL		83	
c. TYPE:				YEAR		0.6	
d. KIND OF AWARD:				CURRENT		58	
e. CUM. AMT.				84		0.8	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Nelson, J H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Vorgetts, L J			
				NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pest Management; (U) Integrated Pest Management; (U) Vector Control; (U) Methodology; (U) RAM I							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop and maintain a pest management science base that will (a) ensure the applied research program is current in new developments in pest management, and (b) develop new militarily unique approaches to integrated pest management. This project is a vital part of a comprehensive vector control program, ensuring a steady stream of new, innovative, and often novel approaches to effective control of arthropod vector populations.</p> <p>24. (U) Through use of in-house expertise and extensive interrelationships with other government agencies and the private sector, conduct basic research in the area of integrated pest management. The approach will be centered on militarily unique aspects of the program.</p> <p>25. (U) 8210 - 8309. Through extensive field research the rotary wing aerial dispersal of selective biological insecticides was ascertained to be both technically feasible and economically practical. Preliminary data from field studies indicate that ultra-low volume applications of insecticide mixed with a diluent are more effective for control of adult mosquitoes than conventional methods utilizing technical grade insecticide.</p>							

DETAIL SHEET

TITLE: (U) Pest Management Science Base

FUNDING HISTORY: PY - 85K; CY - 58K; BY - 63K

PROBLEM DEFINITION: The military has historically adopted particular technologies long after they have been proven in the civil sector. This concept has created a lag that has often resulted in the military acquiring outmoded technology. As the technology advances at an even greater rate, the resultant lag becomes greater so that the problem compounds itself.

IMPORTANCE: The military must have state-of-the-art technology in order to perform its mission to support the combat soldier. Attempting to combat vector-borne diseases with outmoded technology will result in inefficiency, wastefulness, and failure to carry out the mission.

APPROACH: Using in-house expertise and extensive interrelationships with other government agencies and the private sector, basic research will be conducted in the area of integrated pest management. The approach will be centered on militarily unique aspects of the program.

ACHIEVEMENTS: Through extensive field research, the rotary wing aerial dispersal of selective biological insecticides was ascertained to be both technically feasible and economically practical. Preliminary data indicate that the ultra-low volume applications of insecticide mixed with a diluent are more effective for control of adult mosquitoes than conventional methods utilizing technical grade insecticide.

PUBLICATIONS/PRESENTATIONS: None

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG8686	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISB'S INSTR ^a	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	H. TERMINATION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	63732A	3S463732D836	BB	004 APC F306			
b. CONTRIBUTING							
c. CONTRIBUTING	CARDS NO:						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Form/Fit/Function Study for ISO/TEMPER							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.2	
d. KIND OF AWARD:				84		0.0	
e. CUM. AMT.						18	
f. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Conway, W H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Hospital, Field; (U) Shelter; (U) Field Medicine; (U) Bioengineering; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Determine a functional arrangement of medical equipment within expandable International Organization for Standardization (ISO) shelters and Tent, Extendable, Modular, Personnel (TEMPER) tents contemplated for use in field hospitals. The study will include such factors as packability/transportability of equipment within the folding shelters, placement of utilities, power requirements, and other pertinent factors.</p> <p>24. (U) Procure and set up specimen shelters. Different arrangements of the required equipment for various hospital elements will be made within the shelters, and these will be evaluated for the factors defined above under objective.</p> <p>25. (U) 8210 - 8309. A decision was made to adopt d from a similar study being performed by the US Navy.</p>							

DETAIL SHEET

TITLE: (U) Form/Fit/Function Study for ISO/TEMPER

FUNDING HISTORY: PY - 9K; CY - 18K; BY - 0

PROBLEM DEFINITION: In constituting the new MASH hospital, it is desirable to eliminate the MUST expandable shelters and replace them with shelters conforming to the International Organization for Standardization (ISO) standards to achieve uniformity with other services and NATO allies. To accomplish this goal, it is necessary to prove that functional arrangements of field medical equipment can be accommodated by the ISO shelters.

IMPORTANCE: The replacement of special purpose equipment with internationally standardized equipment carries obvious benefits in both cost and maintainability. The resurrection of the MASH hospital in revised form affords an excellent opportunity to replace the MUST expandable shelters which have been trouble prone and represent a unique design.

APPROACH: Equipment layouts and packaging plans will be developed within the ISO shelters for laboratory, pharmacy, surgery, sterile preparation, and X-ray functions of the new MASH. The study will also consider placement of utilities and will seek to minimize the number of different ISO models required.

ACHIEVEMENTS: A decision was made to adopt data from a similar study being performed by the US Navy.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOB6223	83 10 01	DD-DR&E(AR)6J6	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY	63732A	3S463732D836		AA	005 APC F305		
B. CONTRIBUTING							
C. XXXXXXXXXX	CARDS NO: 1400A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Formulations, Controlled-Release, Environmentally Compatible							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
77 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING			
B. NUMBER: ^a				FISCAL YEAR		B. FUNDS (in thousands)	
C. TYPE:		D. AMOUNT:		CURRENT			
E. KIND OF AWARD:		F. CUM. AMT.		84		0.1	
20. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Nelson, J H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Anderson, L M			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pesticide Formulations; (U) Controlled-Release; (U) Pest Management; (U) Environmental Compatibility; (U) Vector Control; (U) RAM I							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Identify and evaluate environmentally compatible controlled-release pesticide formulations of military relevance for use in support of tactical operations and fixed military installation pest management/vector control programs. These results will provide the military with a new series of effective pesticides that are registered for medically important arthropods.</p> <p>24. (U) Utilizing commercially prepared controlled-release pesticide formulations and carriers potentially suitable for military use, quantify release rates and degradation rates in the laboratory. Those formulations found to be best in laboratory tests will be evaluated in field tests to verify laboratory results under natural environmental conditions. Determinations both in the laboratory and in the field will be biological effectiveness, environmental compatibility, cost effectiveness, and compatibility with current standard pesticide dispersal equipment.</p> <p>25. (U) 8210 - 8309. Four controlled-release <u>Bacillus thuringiensis</u> var. <u>israelensis</u> (Bti) formulations utilizing microcapsules and floating granules were evaluated in the laboratory for larvicidal persistence in comparison to a conventional Bti wettable powder (Bactimos[®]) formulation against <u>Anopheles albimanus</u>, <u>Anopheles stephensi</u>, <u>Aedes aegypti</u> and <u>Culex pipiens</u>. The floating granules and microcapsules provided no significant increase in persistence against <u>Ae. aegypti</u> and <u>Cx. pipiens</u>. Microcapsules, at the concentration of 2.0 ppm in treated water, produced 80 percent mortality of <u>An. albimanus</u> and <u>An. stephensi</u> for up to 5 and 10 days, respectively.</p> <p>Evaluation of A Controlled-Release Silicate Formulation of Temephos Against <u>Aedes aegypti</u> Larvae in the Laboratory and <u>Psorophora columbiae</u> Larvae (Diptera: Culicidae) in Rice Field Plots. Anderson, L. M., Nelson, J. H., Thies, C., and Meisch, M. V. <u>J. Med. Entomol.</u> 20:325-329, 1983.</p>							

^a Available to contractors upon originator's approval

DETAIL SHEET

TITLE: (U) Pesticide Formulations, Controlled-Release, Environmentally Compatible

FUNDING HISTORY: PY - 26K; CY - 19K; BY - 10K

PROBLEM DEFINITION: To develop and register long-lasting and environmentally compatible pesticide formulations for use by the military.

IMPORTANCE: Controlled-release environmentally degradable pesticide formulation systems are needed to replace the persistent, broad-spectrum pesticides, like DDT, that have been cancelled or suspended. The current formulations of new compounds are short-lived and have relatively short shelf life; thus they are militarily less acceptable. These shortcomings can be overcome through application of a controlled-release formulation. This should result in reduced pesticide use, an important aspect of military vector control programs.

APPROACH: A controlled-release pesticide formulation system envisions the formulation of pesticides into carriers having chemical or physical characteristics that release the pesticide at a predetermined rate into the environment so that, after a given time, the pesticide and carrier are completely degraded.

ACHIEVEMENTS: Four controlled-release (Bacillus thuringiensis var. israelensis) formulations utilizing microcapsules and floating granules were evaluated in the laboratory for larvicidal persistence in comparison to a conventional Bti wettable power (Bactimos^R) formulation against Anopheles albimanus, Anopheles stephensi, Aedes aegypti, and Culex pipiens. The floating granules and microcapsules provided no significant increase in persistence against Ae. aegypti and Cx. pipiens. Microcapsules, at the concentration of 2.0 ppm in treated water, produced 80 percent mortality of An. albimanus and An. stephensi for up to 5 and 10 days, respectively.

PUBLICATIONS/PRESENTATIONS:

Evaluation of A Controlled-Release Formulation of Temephos Against Aedes aegypti Larvae in the Laboratory and Psorophora ferox Larvae (Diptera: Culicidae) in Rice Field Plots. Anderson, L. M., Nelson, J. H., Thies, C., and Meisch, M. V. J. Med. Entomol. 20:325-329, 1983.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOB6185	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	H. TERMINATION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	63732A	3S463732D836		BA	006 APC F304		
b. CONTRIBUTING							
XXXXXXXXXX	CARDS NO: 1402A						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Field Clinical Analysis System							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 010100 Microbiology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
76 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL		83	
c. TYPE:				YEAR		CURRENT	
d. AMOUNT:				84		0.0	
e. KIND OF AWARD:				84		0.0	
f. CUM. AMT.				84		0.0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Salisbury, L L			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Reams, W H			
				NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Laboratory Equipment; (U) Medical Field Devices;							
(U) Test Kits; (U) Field Laboratory; (U) RAM IT							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Develop through exploratory studies field medical devices and laboratory equipment for clinical analysis of body fluids within Army field medical units.							
24. (U) Conduct a problem definition study to determine functional requirements of a field system. Lightweight, self-contained, ruggedized, and modular components will be developed to satisfy the identified requirements.							
25. (U) 8210 - 8309. This effort has been terminated per recommendation of an IPR. These items are considered to be off-the-shelf acquisition.							

DETAIL SHEET

TITLE: (U) Field Clinical Analysis System

FUNDING HISTORY: PY - 11K; CY - 0; BY - 0

PROBLEM DEFINITION: To develop a modular, portable, and integrated clinical analysis system for the determination of clinically important body fluid parameters in a field environment.

IMPORTANCE: Currently used equipment is a mixture of various commercial equipment that has not been designed to operate in the field. Additionally, the use of different manufacturers' equipment for the same determination increases the logistic, training, and maintenance problems.

APPROACH: Various tests and their location in the medical care chain will be determined. A survey will be made of the procedures available to make the desired tests. A system will be developed that will use common procedures for as many tests as possible and that will provide a modular and integrated system.

ACHIEVEMENTS: This effort has been terminated per recommendation of an IPR since the requirement is being met by off-the-shelf items.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG9318	83 10 01	DD-DR&E(AR)636	
3. DATE PREV. SUMMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	63732A	3S463732D836		BA		007 APC F310	
B. CONTRIBUTING							
XXXXXXXXXX	CARDS NO: 1420K						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Steam Vacuum Pulse Sterilizer (SVP) System							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 010100 Microbiology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 12		84 12		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER:				FISCAL YEAR		83	
C. TYPE:				CURRENT		2.0	
D. KIND OF AWARD:				84		0.8	
E. AMOUNT:						94	
F. CUM. AMT.						57	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: Prensky, W C			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Salisbury, L L			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Field Sterilizers; (U) Power Module; (U) Steam Sterilization; (U) Microbiology; (U) RAM II							
23. TECHNICAL OBJECTIVE. 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Conduct an engineering evaluation of the steam vacuum pulse sterilizer system developed for field Army medical use.							
24. (U) Conduct DT II and OT II testing and evaluation on prototypes of this system.							
25. (U) 8210 - 8309. Operational testing commenced in July 1983 on two of the three prototype sets; however, after a short time, OT II had to be terminated due to the relocation of the field hospital unit performing the test. Operational Test II has been rescheduled to begin early in CY 84.							

DETAIL SHEET

TITLE: (U) Steam Vacuum Pulse Sterilizer (SVP) System

FUNDING HISTORY: PY - 74K; CY - 94K; BY - 57K

PROBLEM DEFINITION: Two 16-inch diameter, gravity-displacement steam sterilizers (NSN 6530-00-926-21451 and 6530-00-027-5260) are available for field installations. They are of aging design, and their speed and size do not satisfy the expected needs of throughput and pack size. A need exists for a sterilizer of the prevacuum type to replace these slower and less efficacious units.

IMPORTANCE: A steam sterilization capability in field hospitals is a necessity. The substitution of a larger, more technologically sophisticated item for units currently in stock will improve logistical support.

APPROACH: A suitable item will be provided by a contract closely monitored by the Laboratory's technical staff. Modifications indicated by DT II will be made prior to OT II to provide a fully satisfactory item.

ACHIEVEMENTS: Operational testing on two complete units was started in July 1983. The test was stopped due to relocation of the field hospital unit performing the test. A new operational test is scheduled for February 1984.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG9320	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DSB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		63732A		3S463732D836		BA 008 APC F311	
b. CONTRIBUTING							
c. CONTRACTOR ACCESS		CARDS NO: 1419R					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Ethylene Oxide Sterilization (EOS) System							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 010100 Microbiology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 12		84 12		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		3.5	
c. TYPE:				CURRENT		115	
d. KIND OF AWARD:				84		1.3	
e. CUM. AMT.						57	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Prensky, W C			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
				SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Salisbury, L L			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Gaseous Sterilization; (U) Aeration; (U) Residues; (U) Toxic; (U) Leak Detector; (U) RAM II							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Conduct an engineering evaluation of the ethylene oxide sterilization system developed for field Army medical use.							
24. (U) Conduct DT II and OT II testing and evaluation on prototypes of this system.							
25. (U) 8210 - 8309. Operational testing commenced in July 1983 on two of the three prototype sets; however, after a short time, OT II had to be terminated due to the relocation of the field hospital unit performing the test. Operational Test II has been rescheduled to begin early in CY 84.							

DETAIL SHEET

TITLE: (U) Ethylene Oxide Sterilization (EOS) System

FUNDING HISTORY: PY - 65K; CY - 115K; BY - 57K

PROBLEM DEFINITION: No reliable field sterilization system exists for the preparation of reusable heat-labile medical equipment. A growing need exists for such a system. Since ethylene oxide is the overwhelming choice in fixed hospitals for the sterilization of heat-labile goods, such a device has been selected to fill this void.

IMPORTANCE: Large amounts of reusable heat-labile medical goods are already in field hospitals. There is also a disturbing but understandable possibility of reusing plastic and rubber goods that were intended for one-time use. To fill this need in the field, complete sterilization is mandatory.

APPROACH: A suitable item will be provided by a contract closely monitored by the Laboratory's technical staff. Modifications indicated by DT II will be made prior to OT II to provide a fully satisfactory item.

ACHIEVEMENTS: Operational testing on two complete units was started in July 1983. The test was stopped due to relocation of the field hospital unit performing the test. A new operational test is scheduled for February 1984.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)656	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	9. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10. LEVEL OF SUM A. WORK UNIT
83 06 15	D. CHANGE	U	U		NL		
10. NO./CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		63732A		3S463732D836		BB 009 APC F314	
b. CONTRIBUTING							
c. EXCLUDED		CARDS NO:					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Medical Element, Mobile							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 006000 Escape, Rescue, and Survival							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 04		85 10		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE:				83		0.3 26	
d. KIND OF AWARD:				84		1.3 115	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a O'Connor, R J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Aid Station; (U) Mobile Aid Station; (U) Trailer Mounted Aid Station; (U) Mobile Medical Element; (U) Field Medical Station; (U) RAM II							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Provide a protected environment for emergency medical treatment in a military mobile trailer mounted facility.							
24. (U) Lists of equipment and supplies that constitute the battalion aid station will be assembled. The weight and volume of the supplies and equipment, as well as weight and volume of a trailer mounted enclosure, electrical generation capability, air handling equipment for chemical protection, panels for ballistic protection, and internal storage facilities, will be studied to provide an optimum configuration which meets the requirement of the proposed letter of agreement. Preliminary design of a mobile medical element will be initiated.							
25. (U) 8306 - 8309. A trailer for use with the Medical Element, Mobile (MEM) has been identified. Current lists of equipment and supplies for the battalion aid station have been secured. Preliminary sketches of a proposed layout have been prepared.							

DETAIL SHEET

TITLE: (U) Medical Element, Mobile

FUNDING HISTORY: PY - 0; CY - 26K; BY - 115K

PROBLEM DEFINITION: To provide a vehicular mounted medical treatment facility for use in forward areas that affords some measure of ballistic and chemical agent protection and which can relocate on short notice.

IMPORTANCE: The predicted fluidity of the European battlefield and the projected mode of operation of the light division in that arena dictate the need for a highly mobile forward medical treatment facility. In addition to ready mobility, the facility will require sufficient armor to afford small arms protection to personnel and a means of dealing with chemical attack.

APPROACH: A trailer mounted facility is viewed as the most cost effective method of satisfying this requirement. The approach will be to select an existing flat-bed trailer from the inventory, equip it with lightweight armor, an electrical generator, and an overpressure system for chemical protection. A medical equipment set having most of the capabilities of the normal battalion aid station will then be packaged into the selected vehicle.

ACHIEVEMENTS: A four-ton, four-wheel military design trailer (M794) has been identified for carrying the Medical Element, Mobile (MEM). A preliminary layout of cabinets, enclosures, storage areas, etc., has been prepared. Manufacturers of various kinds of ballistic protective materials have been contacted. Data bases of the supplies and equipment used in the battalion aid station have been secured. This information will be studied to provide optimum packing of the supplies and equipment in the MEM.

PUBLICATIONS/PRESENTATIONS: None

MEDICAL DEFENSE AGAINST CHEMICAL AGENTS

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^b	REPORT CONTROL SYMBOL	
				DAOG5859	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^c	6. WORK SECURITY ^d	7. REGRADING ^e	8A. DISSEM INSTR ^f	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^g	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
6. PRIMARY	62734A	3M162734A875		BB	221 APC F356		
8. CONTRIBUTING							
c. XXXXXXXXXX	STOG 82/83-6.2/1						
11. TITLE (Precede with Security Classification Code) ^h							
(U) Patient Decontamination Apparatus							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ⁱ 002400 Bioengineering; 003200 Chemical, Biological and Radiological Warfare; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
80 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER ^j :				FISCAL YEAR		83	
c. TYPE:				CURRENT		1.1	
d. KIND OF AWARD:				84		0.8	
e. CUM. AMT.						107	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^k : US Army Medical Bioengineering Research & Development Laboratory				NAME ^k : US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^k : Fort Detrick, Frederick, MD 21701				ADDRESS ^k : Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME ^k : Reams, W H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Chemical Warfare; (U) Field Medical Materiel; (U) Patient Decontamination; (U) Decontamination Apparatus; (U) RAM V							
23. (U) Develop medical materiel for the decontamination of casualties exposed to chemical warfare agents.							
24. (U) Conduct an evaluation of all known methods of decontamination for potential candidates.							
25. (U) 8210 - 8309. Commercial sources were canvased for materials and equipment suitable for patient decontamination apparatus. Contacts were made with other DOD organizations concerning "concepts of operation" and problems in medical defense against chemical warfare agents. A breadboard patient decontamination set was fabricated and forwarded to field units for evaluation. Test results will be forwarded to USAMBRDL when they are available.							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Patient Decontamination Apparatus

FUNDING HISTORY: PY - 151K; CY - 107K; BY - 84K

PROBLEM DEFINITION: The use of toxic chemical agents (TCA) on the integrated battlefield will produce large numbers of chemically contaminated patients. Currently, the US Army does not have any equipment to decontaminate chemically contaminated patients.

IMPORTANCE: It is important to decontaminate patients quickly to save lives, to reduce effects of TCA, and to prevent contamination of medical personnel.

APPROACH: Methods, equipment, and materials used by industry and foreign military organizations are being reviewed. Based on investigations and current doctrine, breadboard models are under development.

ACHIEVEMENTS: A breadboard washing system using a modified Army litter, pump, and water collector was fabricated and sent to field units for evaluation. Tests results will be forwarded to USAMBRDL when they are available.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
1. DATE PREV SUMRY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
82 10 01	D. CHANGE	U	U		NL		
10. NO./CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		62734A		3M162734A875		BB	
b. CONTRIBUTING						223 APC F354	
c. EXCLUDED		STOG 82/83-6.2/1					
11. TITLE (Precede with Security Classification Code) ^a (U) Technical Feasibility Testing (TFT) of Delivery Systems for Chemical Warfare Medicaments							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 002400 Bioengineering; 003200 Chemical, Biological and Radiological Warfare; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
80 05		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER ^a				FISCAL YEAR		83 0.1 1	
c. TYPE:				CURRENT		84 0.3 27	
d. KIND OF AWARD:				f. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering Research & Development Laboratory				NAME ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^a Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME ^a O'Connor, R J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Delivery Systems; (U) Injectors; (U) Injection Methods; (U) Automatic Injectors; (U) Chemical Warfare Antidotes; (U) Field Medical							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
Materiel; (U) Chemical Casualty; (U) RAM V							
23. (U) Evaluate any and all kinds of antidote delivery systems to determine the best method/appliance to contain chemical warfare medicaments.							
24. (U) Conduct market research to determine possible methods/appliances. Prototypes will be obtained and evaluated for potential use based on established military requirements.							
25. (U) 8210 - 8309. Purchase specifications for 2-PAM chloride were reviewed. Vibration tests on Mark I coupler were initiated and completed. A draft specification and drawings on the Mark I nerve agent antidote kit were reviewed and forwarded to USAMRDC.							

DETAIL SHEET

TITLE: (U) Technical Feasibility Testing (TFT) of Delivery Systems for Chemical Warfare Medicaments

FUNDING HISTORY: PY - 23K; CY - 1K; BY - 27K

PROBLEM DEFINITION: There are various methods/types of delivery systems to inoculate personnel with liquid medicaments. This task is to review and evaluate the various known types of systems to ascertain the best method/appliance.

IMPORTANCE: FDA regulations preclude use of multiple type drugs that may be administered by individuals. Personnel operating in a contaminated chemical warfare environment will need candidate materiel for immediate use.

APPROACH: All known commercial injecting methods or systems will be searched and obtained. A list of major characteristics will be prepared, and each method/system will be evaluated against those characteristics to determine which method/system is the best to contain medicaments.

ACHIEVEMENTS: Purchase specifications for the 2-PAM Chloride have been reviewed and comments have been forwarded to the task force. Vibration tests on the Mark I coupler were initiated and completed during 4th Quarter FY 82. Drawings and specifications from the contractor on the Mark I, Nerve Agent Antidote Kit, were reviewed and forwarded to USAMRDC.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG1894	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	9. SPECIFIC DATA - CONTRACTOR ACCESS	10. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		62734A		3M162734A875		BB	
b. CONTRIBUTING						224 APC F353	
c. XXXXXXXX		STOG 82/83-5.2/1					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Evaluation of Foreign Medical Materiel for Use in a Contaminated Environment							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003200 Chemical, Biological, and Radiological Warfare;							
002400 Bioengineering; 009800 Medical & Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
80 01		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.1	
d. KIND OF AWARD:						19	
e. CUM. AMT.				84		0.4	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a O'Connor, R J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Chemical; (U) Biological; (U) Nuclear; (U) Field Equipment; (U) Medical Materiel; (U) Evaluation; (U) Casualty Management; (U) Patient Management; (U) Treatment; (U) RAM V							
23. TECHNICAL OBJECTIVE: ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Evaluate foreign medical materiel/technology/doctrine for AMEDD adoption and use in contaminated field environments. Contaminated environments include nuclear, biological, and chemical warfare. Evaluation and adoption of selected foreign medical materiel/technology/doctrine can rapidly and effectively improve AMEDD's casualty management capabilities.</p> <p>24. (U) Start evaluation of the Federal Republic of Germany's foreign medical materiel/technology/doctrine for patient handling in a chemical warfare environment.</p> <p>25. (U) 8210 - 8309. Reports, equipment, and/or procedures from foreign sources are continually reviewed for potential US Army use. Field decontamination equipment from the Federal Republic of Germany is scheduled for evaluation during FY 84.</p>							

DETAIL SHEET

TITLE: (U) Evaluation of Foreign Medical Materiel for Use in a Contaminated Environment

FUNDING HISTORY: PY - 8K; CY - 19K; BY - 47K

PROBLEM DEFINITION: Several foreign countries have developed doctrine/technology/materiel for patient handling and treatment in contaminated field environments (nuclear, biological, and chemical). To improve AMEDD's casualty management capabilities rapidly and effectively, observance and evaluation of selected foreign medical materiel will be addressed.

IMPORTANCE: The Army Medical Department's doctrine for treatment and handling of field patients is currently being upgraded. Evaluation of foreign materiel would improve, enhance, and speed up positioning of critical materiel to field elements.

APPROACH: Intelligence documents are constantly reviewed for possible candidate materiel. Reports from the Chemical Research and Development Center (CRDC) are reviewed to the same end.

ACHIEVEMENTS: British materiel (MARK III and MARK IV) is being used by NLABS to fabricate patient protective evacuation bags. Comparison of chemical protection of British materiel is being conducted by NLABS. Field decontamination equipment from the Federal Republic of Germany is scheduled for evaluation during FY 84.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG1512	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY	62734A	3M162734A875		CB	226 APC F365		
B. CONTRIBUTING							
C. XXXXXXXX	STOG 82/83-6.2/1						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Resuscitation Device, Individual, Chemical							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 003200 Chemical, Biological and Radiological Warfare; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 05		85 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL		83	
C. TYPE:				YEAR		CURRENT	
D. KIND OF AWARD:				84		0.2	
E. CUM. AMT.						22	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Malek, J W			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Resuscitation; (U) Chemical Warfare Casualty; (U) Field; (U) Medical Materiel; (U) Ventilation; (U) Breathing; (U) RAM V							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Develop a lightweight, compact, manual device to resuscitate chemical warfare casualties, which can be operated by an individual soldier.							
24. (U) Design an approach and contract with industry for fabrication of a device; test and evaluate prototypes.							
25. (U) 8210 - 8309. Redesign of the "Burgin" adapter was completed; a procurement package was prepared and forwarded for the fabrication of 2000 test models. A contract was awarded the 4th Quarter FY 83. In addition, a source selection board was held during the 3rd Quarter FY 83 to review solicitations received in response to an RFQ to meet design criteria. Contract(s) is expected to be awarded during 1st Quarter FY 84.							

DETAIL SHEET

TITLE: (U) Resuscitation Device, Individual, Chemical

FUNDING HISTORY: PY - 39K; CY - 109K; BY - 22K

PROBLEM DEFINITION: No equipment exists today that can ventilate a chemical warfare casualty using the "Buddy-aid" system. Personnel overcome by a chemical agent attack will require ventilation assistance.

IMPORTANCE: Providing lightweight and mechanical equipment to front-line troops will help a number of chemical agent casualties to be revived and maintained until proper medical assistance can be provided.

APPROACH: Designs that will not expose casualties to further contamination are being investigated. Current efforts are being expended and investigated to develop a system whereby the casualty's mask is not removed and pressurized aid is provided by a mechanical hand-operated device.

ACHIEVEMENTS: Design, fabrication, and evaluation of the first breadboard model have been accomplished with fair results. Improved designs have been initiated for additional evaluation.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISSEM INSTR ^a	8b. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL		
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	62734A	3M162734A875		BA		227 APC F357	
b. CONTRIBUTING							
c. SECURITY	STOG 82/83-6.2/1						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Hardening of Medical Materiel Against Chemical Warfare Agents							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 002400 Bioengineering; 003200 Chemical Biological and Radiological Warfare; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 05		CONT		DA		C. In-House	
17. CONTRACT/GRAANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		1.7	
d. KIND OF AWARD:				84		0.8	
e. CUM. AMT.						91	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Patzer, N H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Chemical Warfare; (U) Field Medical Materiel; (U) Chemical Hardening; (U) Decontamination; (U) Chemical Agent Protection; (U) RAM V							
23. (U) Technically harden existing and future military field medical materiel for resistance to contamination and decontamination agents.							
24. (U) Evaluate materials, methods, designs, and equipment for chemical agent resistance in coordination with the Chemical Research and Development Center, Edgewood, MD; advise materiel developers and procuring activities of the results and proper approach.							
25. (U) 8210 - 8309. Commercial sources had been contacted regarding availability of rubber gasket materials resistant to chemical warfare agents and military decontaminating solutions. An IFB was awarded to produce 100 gaskets from rubber resistant to chemical agents. These gaskets will be evaluated for use in standard medical supply chests. Another IFB was awarded to produce 500 plastic litter handles. These handles will be produced from standard commercial plastics and evaluated for use on standard US Army litters. A study of handles and latches for hardened transport cases is continuing. The technical data base for agent resistant designs, materials, and processes is being expanded.							

DETAIL SHEET

TITLE: (U) Hardening of Medical Materiel Against Chemical Warfare Agents

FUNDING HISTORY: PY - 37K; CY - 91K; BY - 101K

PROBLEM DEFINITION: AMMED capabilities to achieve its mission on the integrated battlefield depend on the contamination survivability of mission essential materiel.

IMPORTANCE: Current AMMED materiel will not survive contamination by toxic chemical agents (TCA) and decontamination solutions without loss of essential and RAM characteristics.

APPROACH: Hardened transport cases that will prevent contamination of medical materiel will be developed. Quick-fix improvements to current medical supply chests will protect most medical materiel for the near term.

ACHIEVEMENTS: Commercial sources were contacted regarding availability of rubber gasket materials resistant to chemical warfare agents and military decontaminating solutions. An IFB was awarded to produce 100 gaskets from rubber resistant to chemical agents. These gaskets will be evaluated for use in standard medical supply chests. Another IFB was awarded to produce 500 plastic litter handles. These handles will be produced from standard commercial plastics and evaluated for use on standard US Army litters. A study of handles and latches for hardened transport cases is continuing. The technical data base for agent resistant designs, materials, and processes is being expanded.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA 302678	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	9. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
83 09 09	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62734A	3M162734A875		BE	228	APC F375	
b. CONTRIBUTING							
c. CONTRIBUTING	STOG 82/83-6.2/1						
11. TITLE (Precede with Security Classification Code) ^a (U) Adsorbents for the Recovery, Enrichment, and Transport of Chemical Warfare Agents found in Water							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 003200 Chemical, Biological, and Radiological Warfare; 008300 Inorganic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 05		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL		83	
c. TYPE:				YEAR		0.3	
d. KIND OF AWARD:				CURRENT		54	
e. CUM. AMT.				84		0.3	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Hoke, S H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Shih, M			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Nerve Agents; (U) Adsorbents; (U) Reversed Phase; (U) Separation; (U) Analysis; (U) RAM V							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) The objective of this project is to evaluate the feasibility of using commercially available adsorption cartridges and adsorbents for isolating and concentrating levels of chemical warfare agents in water from below maximum permissible concentrations to levels detectable with cholinesterase test tickets.</p> <p>24. (U) Commercially available adsorption cartridges, packed with different adsorbents will be evaluated for their capacities to extract GA, GB, GD, and VX from water and to release these adsorbates into 1 to 2 mL of eluent. Efficiencies of recoveries and cholinesterase responses will be determined.</p> <p>25. (U) 8305 - 8309. Some commercially available adsorbent cartridges have been obtained and evaluated for adsorption and desorption of the chemical agents GD and GB. Reversed-phase cartridges (C-8 and C-18) give 100% recoveries of GD and 50-60% recoveries of GB at concentrations of 10 ppb. Cholinesterase detects agents at the 20 ppb or higher level. The adsorption cartridges were used to extract GD at 1 ppb level in 100 mL of water. GD was eluted from the cartridges with 0.5 to 2 mL of eluent to give a concentration sensitive to the cholinesterase. The 1 ppb level is fivefold less than the proposed maximum permissible concentration (MAC) of CW agents in drinking water for long term (more than 7 days) consumption.</p>							

DETAIL SHEET

TITLE: (U) Adsorbents for the Recovery, Enrichment, and Transport of Chemical Warfare Agents Found in Water

FUNDING HISTORY: PY - OK; CY - 54K; BY - 44K

PROBLEM DEFINITION: To evaluate the feasibility of using adsorption cartridges for concentrating nerve agents from water to levels detectable with cholinesterase test tickets.

IMPORTANCE: The proposed maximum-permissible concentration of CW agents in drinking water for long-term consumption is 5 ppb. Field test kits presently available have a detection limit of 20 ppb. If adsorption cartridges can be successfully used to concentrate CW agent, the detection limits of available test kits will be lowered significantly.

APPROACH: Various adsorption cartridges will be evaluated for their abilities to concentrate the CW agents GD, GA, GB, and VX from water. The storage and recovery of agents will be studied and cholinesterase responses will be determined.

ACHIEVEMENTS: Several commercially available adsorption cartridges have been evaluated. Using C8 and C18 cartridges, the agent GD gives 100% recovery; whereas GB only gives 50-60% recovery at approximately the 10 ppb level. After 100 mL of water containing 1 ppb of GD was passed through a cartridge, a positive test for nerve agent in the eluate was obtained using a cholinesterase test ticket.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^b	REPORT CONTROL SYMBOL	
				DA 302676	83 10 01	DD-DR&E(AR)836	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^c	6. WORK SECURITY ^d	7. REGRADING ^e	8a. DISSEM INSTR ^f	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
83 09 09	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^g	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	62734A	3M162734A875		BE		229 APC F376	
b. CONTRIBUTING							
XXXXXXXXXX	STOG 82/83-6.2/1						
11. TITLE (Precede with Security Classification Code) ^h							
(U) Toxicity of CW Agent-Contaminated Water after Treatment with Hypochlorite							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ⁱ							
003200 Chemical, Biological, and Radiological Warfare; 012100 Organic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 05		85 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^j				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.1	
d. KIND OF AWARD:				84		0.5	
e. AMOUNT:						2	
f. CUM. AMT.						66	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^k US Army Medical Bioengineering Research & Development Laboratory				NAME: ^k US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^k Fort Detrick, Frederick, MD 21701				ADDRESS: ^k Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^k Rosenblatt, D H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2014			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Toxicity; (U) Detoxification; (U) CW Agents; (U) Hypochlorite; (U) RAM V							
23. TECHNICAL OBJECTIVE. ^l 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To evaluate literature reports which claim that water contaminated with CW agents is not detoxified by treatment with hypochlorite.							
24. (U) Literature reports in which CW agents in water have been treated with hypochlorite will be reviewed and evaluated for scientific merit. Where doubt or uncertainty exists, the authors of the reports will be contacted and asked to comment. Recommendations for or against new research will be made as a result of the evaluations.							
25. (U) 8305 - 8309. Much of the extensive literature on the chemical degradation of CW agents and the detoxification of CW agent-contaminated water has been collected and is being reviewed. Reports show that GA-, GB-, or GD-contaminated water is detoxified when treated with hypochlorite. In the case of VX-contaminated water, however, reports indicate that toxicity has been found to increase up to 2 hours after treatment with hypochlorite. Contacts with investigators are being made to assess the significance of these data.							

DETAIL SHEET

TITLE: (U) Toxicity of CW Agent-Contaminated Water after Treatment with Hypochlorite

FUNDING HISTORY: PY - 0K; CY - 2K; BY - 66K

PROBLEM DEFINITION: To evaluate literature reports which claim that water contaminated with CW agents is not detoxified by treatment with hypochlorite.

IMPORTANCE: The nature and products of decontamination must be understood if decontamination of potable water is to be carried out efficiently.

APPROACH: Interview knowledgeable individuals, perform an extensive literature search, and document conclusions.

ACHIEVEMENTS: Literature search and discussions under way.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA 302680	83 10 01	DD-DR&E(AR)6J6	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DES'N INSTR'M	9a. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM
83 09 09	D. CHANGE		U	U	NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		62734A		3M162734A875		BE 230 APC F377	
b. CONTRIBUTING							
c. COMMENCING		STOG 82/83-6.2/1					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Analytical Reference Standards of Hydrolysis Products of CW Agents							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 012100 Organic Chemistry; 008300 Inorganic Chemistry; 003200 Chemical, Biological, and Radiological Warfare							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 05		84 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL YEAR		83 0.2 46	
c. TYPE:				CURRENT		84 0.7 95	
d. KIND OF AWARD:				f. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Wade, C W R			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7207			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Chemical Warfare Agents; (U) Chemical Synthesis; (U) Elemental Analyses; (U) Reference Reagents; (U) Nerve Agents; (U) RAM V							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) To produce and provide 5- to 10-g samples of highly pure, analyzed batches of the stable hydrolysis products of the CW agents GA, GB, GD, VX, Mustard, and Lewisite to researchers who need these as reference materials. The use of these materials will increase the reliability of Army inter- and intra-laboratory studies.</p> <p>24. (U) Literature searches will be used to identify the hydrolysis products and to outline routes of syntheses. If methods are not available, modifications or new procedures will be evaluated. Synthesis of the above described substances will then be performed.</p> <p>25. (U) 8305 - 8309. Attempts to have some of the phosphonic acids custom-synthesized failed, primarily because of the small quantities, the difficulty of the syntheses, or uncertainties about yield. Routes of synthesis have been selected or developed for isopropyl methyl, ethyl methyl, pinacolyl methyl, and methyl phosphonic acids, primary and secondary hydrolysis products of GA, GB, GD, and VX. Each of these is being synthesized. In some cases, where acids are viscous liquids, they will be packaged as salts.</p>							

DETAIL SHEET

TITLE: (U) Analytical Reference Standards of Hydrolysis Products of CW Agents

FUNDING HISTORY: PY - OK; CY - 46K; BY 95K

PROBLEM DEFINITION: The extent to which chemical and in vivo research with chemical warfare agents is jeopardized by the absence of good standards, though documented in numerous articles, is unknown. Few studies use mass spectroscopy and even in these cases absolute identification is questionable because of the lack of reference standards. The objective of this work is to produce a 0.5- to 1.0-kilogram quantity of the stable primary and/or secondary hydrolysis products of GA, GB, GD, VX, and mustard and, after purification and analysis, to distribute these in 5- or 10-g quantities to researchers.

IMPORTANCE: The sine qua non for the identification of a chemical substance is the quality of the reference standard. Medical, toxicological, and analytical studies will be greatly enhanced where such standards are used and will be questioned where they are not used. Reliability and accuracy of the data can be achieved.

APPROACH: Hydrolysis products that cannot be obtained as "off the shelf" or by custom syntheses from commercial sources will be synthesized. Synthetic methods will be those developed for previous studies with appropriate modifications if necessary. Regardless of the source, each compound will be analyzed elementally and percent purity defined. Compounds with purities below 99.5% will be recrystallized or purified to an acceptable level of purity.

ACHIEVEMENTS: Methods of syntheses were developed for each of the proposed compounds and were used to successfully prepare the alkyl alkylphosphonic acids which correspond to GA, GB, GD, and VX. These are methyl-, ethyl methyl-, isopropyl methyl-, and pinacolyl methylphosphonic acids; their salts are crystalline solids. The intermediate for the synthesis of the pinacolyl methylphosphonic acid was unavailable for several months.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)6J6	
3. DATE PREV SUMRY 82 10 01	4. KIND OF SUMMARY H. TERMINATION	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DISC'N INSTR'N NL	9a. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	62734A	3M162734A875	BB	232 APC F366			
b. CONTRIBUTING							
c. CONTINUING	STOG 82/83-6.2/1						
11. TITLE (Precede with Security Classification Code) ^a (U) Colorimetric Methods for Determining Chemical Agents in Water and on Patients							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 012100 Organic Chemistry; 008300 Inorganic Chemistry; 016800 Toxicology							
13. START DATE 81 10		14. ESTIMATED COMPLETION DATE 83 09		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL		83	
c. TYPE:				YEAR		0.1	
d. KIND OF AWARD:				CURRENT		0.0	
e. CUM. AMT.				84		0	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Trudeau, T L TELEPHONE: (301) 663-7685				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: ^a Wade, C W R TELEPHONE: (301) 663-2036 SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS NAME: McNamee, E NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Chemical Agents; (U) Organophosphorus; (U) RAM V (U) Detection; (U) Colorimetric Methods; (U) Identification; (U) Analytical Methods							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) To develop chemical methods that can be used by medical personnel to detect and identify chemical agents in trace quantities in water under battlefield conditions. 24. (U) After the completion and evaluation of a literature search on methods used for the separation and detection of organophosphorus compounds, the most promising procedure will be tested, modified, and combined to give a thin-layer chromatographic detection system suitable for use in the field. 25. (U) 8210 - 8309. The alkylphosphonic acids, hydrolysis products of GA, GB, GD, and VX, can be separated by TLC analyses as reported earlier. Reference samples of these acids are not commercially available and are needed if TLC is to be used as the method of choice. The acids are being prepared and certified for analyses under Agency Accession Number DA 302680. No further work is planned for this area.							

DETAIL SHEET

TITLE: (U) Colorimetric Methods for Determining Chemical Agents in Water and on Patients

FUNDING HISTORY: PY - 102K; CY - 14K; BY - OK

PROBLEM DEFINITION: In the combat zone a soldier is expected to drink from 5 to 20 liters of water per day, depending upon the assignment and the climate. The use of chemical warfare agents (CW) in the combat zone would pose a threat to the water supplies and the health of the soldier. Water treatment should reduce CW agent concentrations to levels safe for drinking. Currently, the safe levels for GA, GB, GD, and VX in water is below 0.02 mg/L for each. The Army's M272 test kit, using cholinesterase, can detect these agents down to this level but not below. Because the 0.02 mg/L standards were established for 5 L of water per day consumption, it is highly probable that lower concentrations will be established and have been proposed for 20 L per day. Hence, more sensitive detection methods are needed to ensure that the new standards are being met.

IMPORTANCE: Chemical warfare agents occurring in water at concentrations below 0.02 mg/L cannot be detected at present. Any analytical method that can be used rapidly and accurately to detect and identify CW agents will allow water treatment and preventive medicine personnel as well as field commanders to estimate the quality of water and to compare it with approved safe drinking water standards.

APPROACH: The CW agents hydrolyze rapidly in water and even after a lapse of time, the corresponding phosphoric acids will be present. For field use, thin-layer chromatographic procedures, developed especially for pesticide analyses, will be adapted to CW agent separation and detection. The agents and their corresponding acids are colorless, hence, chromogenic agents will be used. Efforts will be made to concentrate dilute solutions to detectable concentrations rather than look for more sensitive reagents. Adsorption cartridges will be evaluated for this phase because they can be used in the field.

ACHIEVEMENTS: Previously, a thin-layer chromatographic (TLC) procedure, using cellulose TLC sheets, were shown to be acceptable for separating and identifying the alkyl alkylphosphonic acids of GA, GB, GD, and VX, separately or in mixtures. The analyses were done in less than 40 minutes. Recoveries of the acids ranged from 75 to 100%, indicating that ion exchange resins may be used in cartridges to separate CW agents from their hydrolysis products. No further work is anticipated in this area until an adequate supply of standard material can be obtained.

PUBLICATIONS: A technical report summarizing the work is in preparation.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA 301043	83 09 30	DD-DR&E(AR)636	
3. DATE PREV SUM'RY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	H. TERMINATION U		U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62734A	3M162734A875		BB	233	APC F367	
b. CONTRIBUTING							
XXXXXXXXXX STOG 82/83-6.2/1							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Chemical Systems Research							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
012100 Organic Chemistry; 012700 Physical Chemistry; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 10		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL		0.2	
c. TYPE:				YEAR		28	
d. KIND OF AWARD:				CURRENT			
e. CUM. AMT.				84		0.0	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Wade, C W R			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7207			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Bausum, H T			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede Each with Security Classification Code)							
(U) CW Agents; (U) Nerve; (U) Blister; (U) RAM V							
(U) Mustard; (U) G-Agents; (U) Detection; (U) Identification; (U) Water Analysis							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) To establish programs and acquire necessary funding for the in-house and/or extramural development of analytical chemical and bioassay system for the rapid identification and detection of chemical warfare agents and mycotoxins in water under battlefield conditions. These systems would be available to water treatment and preventive medicine personnel to ensure that the quality of water used by the soldier for drinking, cooking, and personal hygiene meets the water quality criteria standards of OTSG.</p> <p>24. (U) Technical literature surveys, technical meetings, requirements, and Research and Technology Work Unit summaries will be critically reviewed and used to establish data gaps in the analysis of water for CW agents and mycotoxins. Research proposals will be developed to correct practicable deficiencies after which they will be submitted to the USAMRDC laboratories of interest for evaluation of duplication of effort. Funding will be sought from the appropriate US Army Agency or USAMRDC Research Area Manager.</p> <p>25. (U) 8210 - 8309. Funding was received and six new in-house work units were initiated, three each in Military Disease Hazards and in Medical Aspects of Chemical Defense (DA 302678, DA 302676, DA 302680, DA 302681, DA 302673, and DA 302675).</p>							

DETAIL SHEET

TITLE: (U) Chemical Systems Research

FUNDING HISTORY: PY - OK; CY - 28K; BY - OK

PROBLEM DEFINITION: To establish programs and acquire necessary funding for the in-house and/or extramural development of various analytical chemical and bioassay systems for the rapid identification and detection of chemical warfare agents and mycotoxins in water under battlefield conditions. These systems would be available to water treatment and preventive medicine personnel to ensure that the quality of water used by the soldier for drinking, cooking, and personal hygiene meets the water quality criteria standards of OTSG.

IMPORTANCE: The threat posed by the probable use of CW agents and the need to protect the combat soldiers from the effects of these agents, necessitate the use of the best science and expertise to address many of the analytical problems. This is especially true for analysis of field water supplies.

APPROACH: Technical literature surveys, technical meetings, requirements, and Research and Technology Work Unit summaries will be critically reviewed and used to establish data gaps in the analysis of water for CW agents and mycotoxins. Research proposals will be developed to correct practicable deficiencies after which they will be submitted to the USAMRDC laboratories of interest for evaluation of duplication of effort. Funding will be sought from the appropriate US Army Agency or USAMRDC Research Area Manager. This 1498 is being terminated because the program, though essential, is not a research and development effort.

ACHIEVEMENTS: Funding was received and six new in-house work units were initiated, three each in Military Disease Hazards and in Medical Aspects of Chemical Defense (DA 302678, DA 302676, DA 302680, DA 302681, DA 302673, and DA 302675).

PUBLICATIONS: None.

COMBAT MEDICAL MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG0677	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DRG'N INSTR'N	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	64717A	3S464717D832		AA	003 APC F583		
b. CONTRIBUTING							
c. EXTRACURRICULAR	CARDS NO: 1430R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Sprayer, Powered, ULV, Portable							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL YEAR		c. CURRENT	
c. TYPE:		d. AMOUNT:		83		0.3	
e. KIND OF AWARD:		f. CUM. AMT.		84		0.5	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Pierce, P E			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Nelson, J H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Ultra-Low Volume (ULV) Dispersal; (U) Arthropod Control; (U) Lightweight; (U) Durable; (U) Disease Vectors; (U) Portable; (U) RAM I							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Identify a commercially available, lightweight, durable, portable unit capable of dispersing ultra-low volume (ULV) pesticide formulations. This unit will be used by preventive medicine personnel in combat zones and CONUS for controlling disease vectors and pest arthropods. This project involves engineering and operational evaluation of insecticide dispersal equipment for incorporation into field medical units.</p> <p>24. (U) Review commercially available portable ULV sprayers. Suitable units will be field evaluated. After entomological feasibility has been established, modifications, if necessary, will be made and formal testing coordinated with responsible agencies.</p> <p>25. (U) 8210 - 8309. Increased emphasis on battery powered ULV units has been expressed by military personnel. Evaluations demonstrated that existing battery powered sprayers produce spray droplets that are too large to provide maximum mosquito control efficiency. Two gasoline powered, portable ULV sprayers have been tested and found suitable for military procurement. A recommendation to pursue off-the-shelf (OTS) acquisition strategy was made during an IPR in July 1983.</p>							

DETAIL SHEET

TITLE: (U) Sprayer, Powered, ULV, Portable

FUNDING HISTORY: PY - 1K; CY - 12K; BY - 91K

PROBLEM DEFINITION: To evaluate commercial hand-held ultra-low volume (ULV) sprayers for adoption of an acceptable item into TOE units.

IMPORTANCE: Previous experiences in Southeast Asia and the Mideast have demonstrated the devastating effect outbreaks of arthropod-borne diseases can have on field operations. Many outbreaks start from a small localized area, too big for a field sanitation team to handle but too small for efficient treatment using vehicle-mounted equipment. To fill this technical gap, a small portable ULV sprayer could be used for local control of flies, mosquitoes, and other flying insects.

APPROACH: Several commercially available hand-held ULV sprayers that are either gasoline engine driven or battery powered will be evaluated. Units that pass engineering criteria will be subjected to off-the-shelf (OTS) acquisition strategy.

ACHIEVEMENTS: Increased emphasis on battery powered ULV units has been expressed by military personnel. Evaluations demonstrated that existing battery powered sprayers produce spray droplets that are too large to provide maximum mosquito control efficiency. Two gasoline powered, portable ULV sprayers have been tested and found suitable for military procurement. A recommendation to pursue OTS acquisition strategy was made during an IPR in July 1983.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. ORG'N INSTR'N	9. SPECIFIC DATA - CONTRACTOR ACCESS	10. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	64717A	3S464717D832		BB		004 APC F511	
B. CONTRIBUTING							
C. CONTRIBUTING	CARDS NO: 1416R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Bag, Patient Holding and Evacuation, Prototype Design and Fabrication							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
73 04		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING		B. FUNDS (in thousands)	
B. NUMBER:		C. TYPE:		FISCAL YEAR		D. FUNDS (in thousands)	
		4. AMOUNT:		83		0.4	
A. KIND OF AWARD:		F. CUM. AMT.		84		1.0	
						97	
20. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Thayer, C R			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Evacuation Bag; (U) Arctic Medicine; (U) Cold Climate Medical Material; (U) Patient Transportation; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop a field patient holding and evacuation system capable of maintaining casualties at desired, controlled temperatures in extreme cold climates for prolonged periods. The current field means of protecting injured/sick military personnel in a cold environment from additional complications resulting from exposure to the cold is inadequate from the point of injury through the evacuation system.</p> <p>24. (U) Design and fabricate developmental prototypes based upon previous engineering effort. Existing state-of-the-art materiel will be used. The major technical barrier is to achieve required temperature duration capability with required lightweight characteristics.</p> <p>25. (U) 8210 - 8309. A contract to develop An Improved Army Life Support Power Source System (ALPSS) (propane/liquid) was awarded. The system, with drawings, has been delivered and is now being evaluated.</p>							

DETAIL SHEET

TITLE: (U) Bag, Patient Holding and Evacuation, Prototype Design and Fabrication

FUNDING HISTORY: PY - 19K; CY - 27K; BY - 97K

PROBLEM DEFINITION: The present means of protecting sick and injured personnel in cold environments from additional complications resulting from exposure to the cold is inadequate from the point of injury through the evacuation system.

IMPORTANCE: Protection against exposure to cold must be provided through the evacuation organization until the patient can be moved by a temperature-controlled transportation medium or definitive treatment begins.

APPROACH: A system will be developed for providing heat into the existing insulated casualty evacuation bag. It will include a highly portable and reliable power source and the means to distribute the heat within the bag.

ACHIEVEMENTS: The initial development, consisting of a propane-fired system circulating warm ethylene-glycol solution through a tubulated liner, proved unreliable. A Norwegian development using charcoal fuel and circulating warm air was then evaluated. This system suffered from fuel instability, inadequate heat transfer, and other problems. The effort has now been transferred back to the propane/liquid system because certain modifications have come along that show promise of solving the initial reliability problems. A new system was contracted for and was received along with drawings. An evaluation is presently under way.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^b	REPORT CONTROL SYMBOL	
				DAOA6230	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^c	6. WORK SECURITY ^d	7. REGRADING ^e	8A. DISSEM INSTR ^f	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^g	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	64717A	3S464717D832	BA	012 APC F564			
b. CONTRIBUTING							
c. XXXXXXXXXX	CARDS NO: 1402R						
11. TITLE (Precede with Security Classification Code) ^h							
(U) Optometry Set, Field, Combat							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ⁱ							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
74 05		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^j				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.1	
d. AMOUNT:				84		0.0	
e. KIND OF AWARD:						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^k US Army Medical Bioengineering Research & Development Laboratory				NAME: ^k US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^k Fort Detrick, Frederick, MD 21701				ADDRESS: ^k Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^k Arnold, M F			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Salisbury, L L			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Field Set; (U) Field Optometry; (U) Combat Set; (U) Optometry Set; (U) RAM II							
23. TECHNICAL OBJECTIVE, ^l 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Modernize and update the field optometry set and replace components that are no longer available from commercial sources with new designs.							
24. (U) Design and fabricate engineering development prototypes for DT II and OT II.							
25. (U) 8210 - 8309. All components have been obtained and packaged. A chair with reduced weight and volume was designed around a No. 3 medical chest. Operational Test III was completed successfully. The technical data package was submitted, and the field unit was type classified.							

DETAIL SHEET

TITLE: (U) Optometry Set, Field, Combat

FUNDING HISTORY: PY - 26K; CY - 40K; BY - 0

PROBLEM DEFINITION: To modernize and update the field optometry set and to replace components which are no longer available from commercial sources with new designs.

IMPORTANCE: A functional optometry set is required for the use of optometry personnel assigned to the medical battalion providing division level medical support and other teams providing optometry services.

APPROACH: Engineering prototypes will be designed and evaluated for testing, technical data packages, and type classification.

ACHIEVEMENTS: The complete optometry set has successfully completed OT III. Final drawings have been produced, and the item has been type classified. This project is complete.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY 82 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCTY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DDB'S INSTR ^a NL	9. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		64717A		3S464717D832		AA	
b. CONTRIBUTING						014 APC F566	
c. XEROX/INDEX		CARDS NO: 1213R					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Unit, Solid, Helicopter Slung							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
76 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		1.1	
d. KIND OF AWARD:				84		0.4	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Pierce, P E			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Reams, W H			
				NAME: Nelson, J H			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) ^a							
(U) Helicopter Rig; (U) Solid Dispersal; (U) Aerial Applications; (U) Mosquito Control; (U) Solid Insecticide; (U) RAM I							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Identify a suitable commercial, helicopter slung, pesticide dispersal unit for applying solid formulations of insecticides, which would (a) be capable of dispersing insecticides when slung beneath a helicopter, (b) require no modification of the aircraft, and (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS.</p> <p>24. (U) A Simplex spreader was evaluated with various pesticide formulations under a variety of conditions and was found to be unsatisfactory due largely to the vertically actuated gate system. A Chadwick, Inc., applicator with a horizontally actuated gate system was procured and modified for remote control operation. Feasibility and military adaptability have been established under field conditions.</p> <p>25. (U) 8210 - 8309. The equipment was recommended for type classification in December 1982.</p>							

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Unit, Solid, Helicopter Slung

FUNDING HISTORY: PY - 8K; CY - 66K; BY - 54K

PROBLEM DEFINITION: To adapt a commercial item capable of dispensing solid pesticide formulations for use in the military operation environment.

IMPORTANCE: Medical personnel engaged in field operations need the capability for aerial dispersal of solid pesticide formulations to ensure rapid treatment of large areas inaccessible by ground equipment but too small for efficient use of larger aerial dispersal equipment. Currently, field units have no item of equipment with the capability, although their mission and TOE require it.

APPROACH: A commercially available spreader which is slung beneath a helicopter on the helicopter's cargo hook is being adapted for military use.

ACHIEVEMENTS: The Pesticide Dispersal Unit, Solid, Helicopter Slung, was approved for type classification at the December 1982 IPR.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOA6290	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		64717A		3S464717D832		BB 015 APC F568	
b. CONTRIBUTING							
c. CONTRIBUTING		CARDS NO: 1604R					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Environmental Protection Containers for Medical Supplies							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
74 09		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				b. FREEDOM		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL YEAR		83 0.3 23	
c. TYPE:				CURRENCY		84 0.1 13	
d. KIND OF AWARD:				f. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Conway, W H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Patzer, N H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Environmental Container; (U) Field Container; (U) Arctic Field Container; (U) Medical Supply Container; (U) Arctic Supplies; (U) Arctic Protection; (U) RAM II							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop a container to protect freezable military medical items in an Arctic environment. This equipment will perform an ancillary function related to medical treatment in a field environment.</p> <p>24. (U) Design, fabricate, and evaluate a container to meet the requirements of Arctic use.</p> <p>25. (U) 8210 - 8309. Maintenance evaluation of the latest prototype produced some minor changes in design. An acceptance IPR is anticipated early in FY 84.</p>							

DETAIL SHEET

TITLE: (U) Environmental Protection Containers for Medical Supplies

FUNDING HISTORY: PY - 28K; CY - 23K; BY - 13K

PROBLEM DEFINITION: To provide a means of storing biologicals that are subject to damage by freezing during field operations in arctic or subarctic regions.

IMPORTANCE: The present lack of a dedicated piece of equipment to cope with this problem has led to spoilage of large quantities of biological materials in Alaska. Present methods of preserving freezables are makeshift and totally inadequate.

APPROACH: A lightweight, insulated chest that includes electrical strip heaters and a temperature control circuit will be developed. This chest, issued to appropriate field units, would be dedicated to the storage and preservation of freezable medical materials. The chest will also be designed to protect freezables for several hours during unpowered transport.

ACHIEVEMENTS: A final prototype, incorporating revisions stemming from a maintenance review, has been constructed and tested. The data package has been prepared, and the task is awaiting final IPR approval for type classification.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOB6249	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. ORIGIN INSTR ^a	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		64717A		3S464717D832		BA 041 APC F573	
b. CONTRIBUTING							
c. X-RAY/EX		CARDS NO: 1415R					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Low Capacity Radiographic System, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003500 Clinical Medicine; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 01		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL		83 0.4 43	
c. TYPE:				YEAR		CURRENT	
d. KIND OF AWARD:				84		1.1 98	
1. CUM. AMT.							
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Salisbury, L L			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) X-Ray; (U) Field Medicine; (U) Field Equipment; (U) Radiology; (U) RAM II							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Identify a suitable low capacity radiographic system to include film processor(s), compatible film(s), cassettes and other operating accessories for AMEDD usage (except dental).							
24. (U) Search existing industrial sources for functional devices that can be adopted. If none are available, modify, design, or contract for the design of new devices.							
25. (U) 8210 - 8309. A survey of commercial X-ray devices had been made. It was decided at an IPR during 1st Quarter FY 81 that no commercial radiographic system would satisfy the requirements of a field unit, and a development contract should be let. Two contractors had been selected. One manufacturer failed to deliver. One unit was received during the 4th Quarter FY 83, and developmental testing is under way.							

DETAIL SHEET

TITLE: (U) Low Capacity Radiographic System, Field

FUNDING HISTORY: PY - 10K; CY - 43K; BY - 98K

PROBLEM DEFINITION: To identify suitable automatic film processors, compatible film, cassettes, and accessories for interfacing with a low capacity radiographic apparatus. To identify a suitable low capacity radiographic system for field medical use.

IMPORTANCE: Currently available X-ray systems are not suitable for use by small medical units outside of field type hospitals based on weight, complexity, and utility requirements. The need is critical for a low capacity X-ray apparatus.

APPROACH: A survey of commercially available film processors and low capacity X-ray systems was made to determine their ability to satisfy the letter requirements.

ACHIEVEMENTS: A market survey uncovered no commercial X-ray units that would meet the letter requirements. An RFP was advertised, and two contractors were selected. One manufacturer failed to deliver. One unit was received during the 4th Quarter FY 83 and is currently undergoing development testing.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)656	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DR&E INSTR'N	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUB A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	64717A	3S464717D832		BA	042 APC F574		
b. CONTRIBUTING							
c. CONFIDENTIALITY	CARDS NO: 1H25R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) High Capacity Radiographic System, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003500 Clinical Medicine: 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 02		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		1.0	
d. KIND OF AWARD:				84		0.6	
e. AMOUNT:						62	
f. CUM. AMT.						55	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a O'Connor, R J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Salisbury, L L			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) X-Ray: (U) Field Medicine: (U) Field Equipment: (U) Radiology: (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Identify and evaluate a replacement field X-ray system for the current military standard (100 mA and 200 mA) system which is inadequate in reliability, availability, and maintainability.</p> <p>24. (U) Search existing commercial sources for functional components (X-ray source, table, power supplies, film processors) that can be adopted. If none are available, modify, design, or contract for design of new devices.</p> <p>25. (U) 8210 - 8309. Limited testing of the modified system was conducted. On the basis of this and previous testing, a decision was made to negotiate a contract with a commercial vendor to produce a complete high capacity field radiographic system. A work statement was prepared, and the RFQ was published. Responses are due by 18 October 1983.</p>							

AD A136 926

US ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT
LABORATORY ANNUAL... (U) ARMY MEDICAL BIOENGINEERING
RESEARCH AND DEVELOPMENT LAB FORT... T L TRUDEAU

2/2

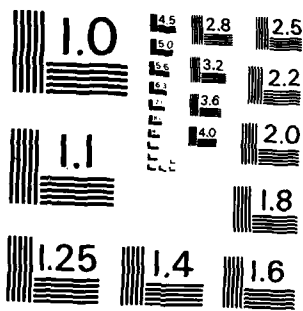
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END
DATE
FWD
2 84
DTN



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

DETAIL SHEET

TITLE: (U) High Capacity Radiographic System, Field

FUNDING HISTORY: PY - 184K; CY - 62K; BY - 55K

PROBLEM DEFINITION: The current field radiographic system is inadequate in reliability, availability, maintainability and does not conform to the radiation requirements of 21 CFR.

IMPORTANCE: The lack of a working, reliable, certifiable, high capacity X-ray system to meet the radiological requirements of field medical treatment facilities has a significant impact on the ability of these activities to provide basic health care. The need is critical.

APPROACH: A search of commercial sources will be made for a functional system or components that can be combined into a system that will meet the field requirements.

ACHIEVEMENTS: A survey has been made of the commercial market. No commercial system has been found that will meet the letter requirement. Commercially available components have been obtained and have been adapted and modified into a radiological system compatible with field requirements. This system is composed of a commercial control unit, transformer, X-ray source, and image intensifier system. These items have been matched to the Army 5090 field table. Film processing is provided by using a commercial wet processor with a daylight loader and a water recycling system. The system underwent operational testing during the 1st Quarter FY 81. Of the 16 critical issues, 10 were satisfied fully and 4 partially. Two issues were unresolved. After limited testing of the system in August 1982, a decision was made to negotiate a contract for the development and production of the high capacity radiographic system. A comprehensive work statement was prepared, and the RFQ was published. A contractor will be selected based on the decision of a source selection board to be convened after 18 October 1983, when responses to the solicitation are due.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG0701	83 10 01	DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8a. DISSEM INSTR ^a	8b. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	64717A	3S464717D832		AA	044 APC F581		
b. CONTRIBUTING							
c. CONTRIBUTING	CARDS NO: 1429R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Trap, Mosquito, Light, Collapsible							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering; 005900 Environmental Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		1.0	
d. KIND OF AWARD:				84		0.4	
e. CUM. AMT.						77	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
ADDRESS: ^a				ADDRESS: ^a			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)			
NAME: Trudeau, T L				NAME: ^a Pierce, P E			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: O'Connor, R J			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Mosquito Light Trap; (U) Disease Vectors; (U) Pest Mosquitoes; (U) Mosquito Surveys; (U) Population Studies; (U) RAM I							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop a collapsible mosquito light trap which is powered solely from AC sources. The trap will be used at fixed installations and static deployment in disease vector and pest mosquito surveys. This will replace the standard mosquito light trap (NSN 3740-00-607-0337, LIN X24251) which is bulky and unreliable for field use.</p> <p>24. (U) Design and fabricate a suitable collapsible, AC powered, mosquito light trap and conduct field evaluations in various habitats.</p> <p>25. (U) 8210 - 8309. A prototype design has been fabricated and will undergo field testing and laboratory testing to assure capability in trapping disease vectors in a more effective manner than with existing mosquito light traps. Testing will also develop guidelines for design features for durability and reliability.</p>							

DETAIL SHEET

TITLE: (U) Trap, Mosquito, Light, Collapsible

FUNDING HISTORY: PY - 4K; CY - 65K; BY - 77K

PROBLEM DEFINITION: To develop an improved replacement for the Trap, Mosquito, Light (NSN 3740-00-607-0337) that is collapsible for storage, is capable of using a variety of lamps, and has an extended service life.

IMPORTANCE: The Trap, Mosquito, Light is a bulky, heavy item which is part of the TOE of the Preventive Medicine Detachment, Team LA, Entomology Services (TOE 8-620HOLA). It is an important instrument for surveillance of medically important insects in areas of static troop deployment where surveys are continued for prolonged lengths of time. This trap will provide long-term information on the control efforts of an IPM program.

APPROACH: A new collapsible, AC powered light trap will be fabricated in-house. The primary objective is to produce a durable trap that can be easily disassembled and collapsed for storage and shipment

ACHIEVEMENTS: A prototype system has been fabricated. Development testing will begin 1st Quarter FY 84. Results from field tests in FY 83 will be used to evaluate acceptability of the trap design.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a DAOG0700		2. DATE OF SUMMARY ^a 83 10 01		REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY 82 10 01		4. KIND OF SUMMARY K. COMPLETION		5. SUMMARY ACTY ^a U		6. WORK SECURITY ^a U		7. REGRADING ^a	
8. DISSEM INSTR ^a NL		9a. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		9. LEVEL OF SUM A. WORK UNIT					
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY		64717A		3S464717D832		AA		045 APC F582	
b. CONTRIBUTING									
c. XXXXXXXXXX		CARDS NO: 1428R							
11. TITLE (Precede with Security Classification Code) ^a (U) Aerosol Generator, ULV, Skid Mounted									
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering									
13. START DATE 79 10			14. ESTIMATED COMPLETION DATE 83 09			15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT									
a. DATES/EFFECTIVE:		EXPIRATION:		18. RESOURCES ESTIMATE PRECEDING		a. PROFESSIONAL MAN YRS		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR 83		0.0		0	
c. TYPE:		d. AMOUNT:		CURRENCY 84		0.0		0	
e. KIND OF AWARD:		f. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION					
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory					
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701					
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)					
NAME: Trudeau, T L				NAME: ^a Pierce, P E					
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237					
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:					
				ASSOCIATE INVESTIGATORS					
				NAME: Nelson, J H					
				NAME: Reams, W H					
				POC:DA					
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Aerosol Generator; (U) Ultra-Low Volume (ULV) Dispersal; (U) Mosquito Control; (U) Skid Mounted; (U) Durable; (U) Disease Vector; (U) RAM I									
23. (U) Identify and evaluate a commercially available, skid mounted, ultra-low volume (ULV) aerosol generator capable of dispersing all ULV insecticide formulations registered for mosquito control. This generator would be used by preventive medicine and engineering personnel in combat zones and CONUS for controlling disease vectors and pest arthropods.									
24. (U) A review of commercially available ULV aerosol generators has been made. Suitable units were field evaluated. Final selection of specification characteristics, which was coordinated with responsible agencies, was made after formal testing.									
25. (U) 8210 - 8309. Following successful type classification the aerosol generator was transitioned to the readiness command in January 1983.									

DETAIL SHEET

TITLE: (U) Aerosol Generator, ULV, Skid Mounted

FUNDING HISTORY: PY - 3K; CY - 0; BY - 0

PROBLEM DEFINITION: To evaluate and recommend for adoption into TOEs an ultra-low volume (ULV) aerosol generator to replace current cold fog generators.

IMPORTANCE: Since 1970 commercial pest control has used the environmentally acceptable methods of the ULV aerosol generator for adult mosquito control. In this area, the military has not maintained state-of-the-art. Adoption of these generators will provide the TOE units the capabilities to control adult mosquitoes using ULV techniques.

APPROACH: Commercial units of a high-air volume, low-air pressure design will be evaluated both functionally and operationally. Results will be used as the basis for procurement of aerosol generators.

ACHIEVEMENTS: An IPR recommended type classification of the aerosol generator. All actions necessary to transition to the readiness command have been completed. This project is complete.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^b	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^c	6. WORK SECURITY ^d	7. REGRADING ^e	8A. DISSEM INSTR ⁿ	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		64717A		3S464717D832		AA	
b. CONTRIBUTING						046 APC F576	
c. CONTRIBUTING		CARDS NO: 1404A					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Unit, Portable, Backpack							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
76 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENCY		0.1	
d. KIND OF AWARD:				84		0.1	
e. CUM. AMT.						15	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Pierce, P E			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J H			
				NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Backpack; (U) Solid/Liquid Dispersal; (U) Arthropod Control; (U) Lightweight; (U) Durable; (U) Disease Vectors; (U) Portable; (U) RAM I							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Identify a commercially available, lightweight, durable, backpack unit capable of dispersing solid or liquid pesticide formulations. This unit would be used by preventive medicine personnel in combat zones and CONUS for controlling disease vectors and pest arthropods.							
24. (U) Review commercially available backpack units. Suitable units will be evaluated. After operational feasibility has been determined, a suitable item of equipment will be selected for off-the-shelf (OTS) acquisition strategy.							
25. (U) 8210 - 8309. The equipment was type classified in December 1982.							

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Unit, Portable, Backpack

FUNDING HISTORY: PY - 7K; CY - 9K; BY - 15K

PROBLEM DEFINITION: To evaluate and recommend adoption of a commercial motorized backpack unit that is capable of dispensing both liquid and solid pesticide formulations.

IMPORTANCE: An operational need exists for a motorized backpack unit that can dispense both liquid and solid pesticide formulations. The unit is needed to provide control during field operations in localized and remote areas where vehicular or aerial dispersal equipment cannot be used or is not readily available.

APPROACH: Available commercial backpack units will be evaluated from an engineering aspect to determine the best candidate units for operational evaluation. Selected units will be evaluated by an operational user to determine any unforeseen problems in deployment.

ACHIEVEMENTS: The Pesticide Dispersal Unit, Portable, Backpack, was approved for type classification at the December 1982 IPR.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISEM INSTR ^a	9. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	AA	047 APC F577			
B. CONTRIBUTING							
CARDS NO: 1424R							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Unit, Liquid, Helicopter Slung							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
76 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATE/EFFECTIVE:				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER:				FISCAL YEAR		C. CURRENT	
C. TYPE:				83		0.7	
D. AMOUNT:				84		0.2	
E. KIND OF AWARD:				41			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)			
NAME: Trudeau, T L				NAME: Pierce, P E			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Reams, W H			
				NAME: Nelson, J H			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Helicopter Rig; (U) Liquid Dispersal; (U) Aerial Application; (U) Mosquito Control; (U) Liquid Insecticide; (U) RAM I							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Identify a suitable commercial, helicopter slung, dispersal unit for applying liquid formulations of insecticides, which would (a) be capable of dispensing liquid insecticides when slung beneath a helicopter, (b) require no modification of the aircraft, and (c) be capable of applying adequate swath widths and deposition rates for controlling disease vectors in combat situations or CONUS.</p> <p>24. (U) A Transland Unit has been selected as the most suitable unit for field feasibility. Modifications will be made prior to further operational testing. The unit has been used successfully in actual field mosquito control operations.</p> <p>25. (U) 8210 - 8309. The Transland Unit had been modified to satisfy the deficiencies observed in OT II. Further modifications to improve the ultra-low volume capability had been made. Operational Test IIa was completed in 1st Quarter FY 83. Type classification was completed in July 1983.</p>							

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Unit, Liquid, Helicopter Slung

FUNDING HISTORY: PY - 107K; CY - 51K; BY - 41K

PROBLEM DEFINITION: To adapt a commercial aerial sprayer to meet the needs of the military for a slung unit that is capable of liquid dispersal in both high volume and ultra-low volume (ULV) modes.

IMPORTANCE: Medical personnel engaged in field operations need the capacity for aerial dispersal of liquid pesticide formulations. The unit is needed to ensure rapid treatment of large areas inaccessible by ground equipment but too small for efficient use of larger aerial dispersal equipment. Current standard item represents a health and safety hazard to the helicopter crew since unit is internally mounted instead of slung.

APPROACH: A readily available commercial sprayer will be adapted for military use. The commercial sprayer will be modified to include a ULV Beecomist nozzle system and a means for effective control of unit functions from the interior of the helicopter. The unit will be completely independent of the helicopter and easily jettisonable in an emergency.

ACHIEVEMENTS: The Transland Unit has been modified to satisfy the deficiencies observed in OT II. Further modifications to improve the ULV capability have been made. Operational Test IIa was completed in 1st Quarter FY 83. Type classification was completed in July 1983.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOB6247	83 10 01	DD-DR&E(AR)656	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9a. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	64717A	3S464717D832		CA	048 APC F580		
b. CONTRIBUTING							
c. EXPERIMENTAL	CARDS NO: 1415R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) X-Ray Film Processor, Dental, Portable, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
003500 Clinical Medicine; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
78 12		83 06		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		70	
c. TYPE:				CURRENT		0.7	
d. AMOUNT:				83		0.0	
e. KIND OF AWARD:				84		0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Malek, J W			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) X-Ray; (U) Field Medicine; (U) Field Equipment; (U) Dental Processor; (U) Processor; (U) RAM IV							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Identify a suitable X-ray film processing portable field unit to support a low capacity X-ray unit for military field use.							
24. (U) Search existing industrial sources for a functional device that can be adopted. If none is available, modify, design, or contract for the design of a new device.							
25. (U) 8210 - 8309. An IPR held in December 1982 recommended adoption of the Peri-Pro Dental X-Ray Processor and introduction into the US Army inventory. The proposed military specification and other technical data were forwarded on 20 June 1983.							

DETAIL SHEET

TITLE: (U) X-Ray Film Processor, Dental, Portable, Field

FUNDING HISTORY: PY - 20K; CY - 70K; BY - 0

PROBLEM DEFINITION: To identify a suitable X-Ray Film Processing Portable Field unit to support a low capacity X-ray unit.

IMPORTANCE: Portable wet X-ray film processors and accessories are not suitable for use by small dental units outside of field type hospitals based on excessive weight, complexity, and requirements for electrical power, water, and processing chemicals. The need is acute for dental units/sections to complement the low capacity X-ray apparatus recently approved for limited procurement.

APPROACH: Search and obtain an industrially developed functional device that can be adapted to meet the established characteristics.

ACHIEVEMENTS: Operational Testing I (OT I) was initiated on 16 July 1979 and completed on 26 October 1979. Results were good with only minor design changes. The prototype was modified to correct OT I deficiencies and then subjected to DT II. Development Testing II was successfully concluded on 3 March 1980. Maintenance evaluation was accomplished and concluded on 3 March 1981. A modified commercial Operations and Maintenance Manual was reviewed and accepted by USAMMA. An IPR, held on 7 December 1982, recommended that the prototype be adopted and introduced into the Army inventory. This task has been successfully completed.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	64717A	3S464717D832	BB	049 APC F578			
B. CONTRIBUTING							
C. CONTRIBUTING	CARDS NO: 1421R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Bag, Aidman's, Redesign of							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
77 05		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER: ^a				FISCAL YEAR		83	
C. TYPE:				CURRENT		0.3	
D. KIND OF AWARD:						18	
E. AMOUNT:				84		0.0	
F. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a O'Connor, R J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Aid Bag; (U) Aidman; (U) Emergency Medical Treatment; (U) Field Medical Equipment; (U) Case, Medical Instrument and Supply; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop an improved aid bag for use by the platoon aidman.</p> <p>24. (U) Establish a functional criteria for aid bags. Several potential replacements will be designed, fabricated, and evaluated. The best features of each model will be incorporated into a final design.</p> <p>25. (U) 8210 - 8309. The water-repellent aid bag was adopted as standard equipment by the US Army in December 1982. Drawings and specifications were checked and revised as necessary. The technical data package was forwarded to DPSC as required.</p>							

DETAIL SHEET

TITLE: (U) Bag, Aidman's, Redesign of

FUNDING HISTORY: PY - 59K; CY - 18K; BY - 0

PROBLEM DEFINITION: The current case, Medical Instrument and Supply Set (NSN 6545-00-912-9870) has been found inadequate. Because of the small size and configuration of the bag, the aidman is severely limited in his treatment capability in combat. The need exists for a larger bag which provides easier access to its contents.

IMPORTANCE: The ability of the combat medical corpsman to provide prompt and effective treatment to soldiers in the field will be greatly enhanced by providing him with an aid bag containing a wider variety of medications, dressings, and instruments which are easily accessible.

APPROACH: Various bags and cases which are already in the supply system were investigated. The bags most suitable for the projected need of the platoon aidman were either too small (M-3), overly compartmented (M-16), or without organizing compartments (M-5).

ACHIEVEMENTS: A compartmented aid bag has been designed and fabricated. The bag has six zippered compartments and is built in three sections that fold together for transport. The bag has an approximate volume of one cubic foot, D rings for the attachment of a shoulder sling, loops for use with shoulder straps or a pack frame, and a carrying handle. Prototype bags have been fabricated and evaluated at Ft. Bragg, Ft. Lewis, and in Europe with generally favorable results. At a joint working group and a subsequent IPR, the aid bag was standardized. The technical data package consisting of drawings, patterns, and specifications was forwarded to USAMMA and then to DPSC. This project is complete.

PUBLICATIONS/PRESENTATIONS: None

SCIENCE BASE MEDICAL DEFENSE AGAINST BIOLOGICAL WARFARE

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3. DATE PREV SUMMARY 83 09 09	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8A. DISSEM INSTR ^a NL	8B. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	61102A	3M161102BS12		AE		030 APC F427	
b. CONTRIBUTING	61102A	3M161102BS10		AR		030	
XXXXXXXXXX STOG 82/83-6.2/2							
11. TITLE (Precede with Security Classification Code) ^a (U) Bioassay for Mycotoxins in Water Using Brine Shrimp Larvae							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 002600 Biology; 003200 Chemical, Biological, and Radiological Warfare							
13. START DATE 83 05		14. ESTIMATED COMPLETION DATE 84 09		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL		83	
c. TYPE:				YEAR		CURRENT	
d. AMOUNT:				84		0.1	
e. KIND OF AWARD:				f. CUM. AMT.		10	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Hoke, S H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Toxicity; (U) Brine Shrimp; (U) Trichothecene Mycotoxins; (U) Artemia salina; (U) RAM I							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) The purpose of this project is to develop a rapid field test for trichothecene mycotoxin toxicity in Army field water supplies. 24. (U) Literature studies on the detection of mycotoxins using brine shrimp will be reviewed. Promising procedures with potential for field adaptation will be selected and evaluated in the laboratory. Dose responses and LC-50 will be established for each of 12 trichothecenes and zeralenone. Test times of 25 to 30 minutes are desirable. 25. (U) 8305 - 8309. Data have been obtained on the toxicity of methanol as a candidate solvent for the recovery of toxins from adsorption cartridges. Experiments have shown that it is practicable to hatch and maintain brine shrimp nauplii for daily and routine testing. Data on sensitivity to a reference toxicant, sodium dodecylsulfate, are being evaluated.							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Bioassay for Mycotoxins in Water Using Brine Shrimp Larvae

FUNDING HISTORY: PY - OK; CY - 28K; BY - 10K

PROBLEM DEFINITION: To develop a rapid field test for trichothecene mycotoxin toxicity in Army field water supplies using brine shrimp.

IMPORTANCE: The possibility of chemical agents being in water poses a critical threat to the combat effectiveness of the soldier in the field. Therefore, field tests to determine the toxicity of drinking water need to be developed. A short-term toxicity test for mycotoxins using brine shrimp will be developed and evaluated for field use.

APPROACH: Literature studies on the detection of mycotoxins using brine shrimp will be reviewed. Promising procedures with potential for field adaptation will be selected and evaluated in the laboratory. Dose responses and LC-50 will be established for each of 12 trichothecenes and zeralenone. Test times of 25 to 30 minutes are desirable.

ACHIEVEMENTS: Experiments have shown that it is practicable to hatch and maintain brine shrimp nauplii for daily and routine testing. Preliminary LC50 data using the reference toxicant sodium dodecyl-sulfate appear to agree with values reported in the literature.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)616	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	9a. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM
83 09 09	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	61102A	3M161102BS12	AE	031	APC F428		
b. CONTRIBUTING	61102A	3M161102BS10	AR	031			
XXXXXXXXXX STOG 82/83-6.2/2							
11. TITLE (Precede with Security Classification Code) ^a (U) Chemical Detection and Identification of Trichothecene Mycotoxins in Field Water Supplies							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 007800 Hygiene and Sanitation; 003200 Chemical, Biological, and Radiological Warfare							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 05		85 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER *				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE:				83		0.5	
d. KIND OF AWARD:				84		54	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701				NAME: US Army Medical Bioengineering Research & Development Laboratory ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Trudeau, T L TELEPHONE: (301) 663-7685				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME: Burrows, E P TELEPHONE: (301) 663-2036 SOCIAL SECURITY ACCOUNT NUMBER:			
21. GENERAL USE Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS NAME: NAME:			
22. KEYWORDS (Precede EACH with Security Classification Code)				POC:DA			
(U) Trichothecene; (U) Mycotoxins; (U) Thin-layer Chromatography; (U) Gas Chromatography; (U) RAM I							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To develop reliable and rapid methodology for the detection, identification, and quantitation of certain trichothecenes in Army field water supplies.							
24. (U) Trichothecenes in water will be concentrated by means of adsorbent cartridges to levels detectable by thin-layer chromatography (TLC) using a colorimetric/densitometric method specific for the toxins. Gas chromatographic (GC) methodology will be developed concurrently.							
25. (U) 8305 - 8309. An organophosphorus pesticide, used as a model, and T-2 toxin have been detected and quantitated using TLC with colorimetric/densitometric detection. Results indicate that adequate precision and accuracy are attainable to the 200 ppb level. Preliminary studies with GC/electron capture detection show that T-2, as the trifluoroacetate derivative, is readily detectable at the 1 ppb level. Precision over the range 1-100 ppb, however, remains to be demonstrated.							

DETAIL SHEET

TITLE: (U) Chemical Detection and Identification of Trichothecene
Mycotoxins in Field Water Supplies

FUNDING HISTORY: PY - OK; CY - 53K; BY - 54K

PROBLEM DEFINITION: While methodology for the extraction, separation, and identification of trichothecenes from grain and other food samples has been extensively developed, methodology for determination in trace amounts in water is lacking.

IMPORTANCE: To ensure the safety of field personnel in the event of deployment of trichothecenes as CW agents, a rapid and specific procedure for screening of field water samples is needed.

APPROACH: Trichothecenes in water will be concentrated by means of adsorbent cartridges to levels detectable by TLC using a colorimetric/densitometric method specific for the toxins. GC methodology will be developed concurrently.

ACHIEVEMENTS: For T-2 toxin, the TLC colorimetric/densitometric method appears adequately precise and accurate with a detection limit of 200 ppb. Preliminary GC/electron capture studies with T-2 (as the trifluoroacetate derivative) have shown detectability at 1 ppb, but precision and accuracy are not yet acceptable.

PRESENTATION: "Analytical Chemical Methods Development for Trichothecenes" presented by E.P. Burrows at DOD Toxin Defense Coordinaton Meeting, Aberdeen Proving Ground, MD, March 23, 1983.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA 302675	83 10 01	DD-DR&E(AK)636	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM
83 09 09	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	61102A	3M161102BS12		AE	032	APC F429	
b. CONTRIBUTING	61101A	3M161102BS10		AR	032		
XXXXXXXXXX	STOG 82/83-6.2/2						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Microbial Degradation and Yeast Bioassay of Trichothecene Mycotoxins							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 003200 Chemical, Biological, and Radiological Warfare							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
83 05		85 09		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER *				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE:				83		0.7	
d. AMOUNT:				84		0.5	
e. KIND OF AWARD:						58	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME * US Army Medical Bioengineering				NAME * US Army Medical Bioengineering			
ADDRESS * Research & Development Laboratory				ADDRESS * Research & Development Laboratory			
Fort Detrick, Frederick, MD 21701				Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME * Mitchell, W R			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Trichothecene; (U) Yeast Bioassay;							
(U) Microbial Degradation; (U) Degradation Kinetics; (U) RAM I							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) The first objective of the research is to provide estimates of the longevity of priority trichothecenes in surface waters. The second objective is to determine if it is feasible to use yeasts as a simple, inexpensive, and rapid assay and detection system for the trichothecenes in Army field water supplies.</p> <p>24. (U) To estimate the longevity of T-2 toxin in surface waters, natural water samples will be incubated with the toxin, and levels of bacteria and rates of toxin disappearance will be measured. From the pseudo-first order rate data, second order rate constants and half-lives of the toxin will be calculated and compared from site to site. To determine if it is feasible to utilize yeasts as an assay or detection system for trichothecenes, various yeast species will be screened for their sensitivity to T-2 toxin. The most sensitive organism(s) will be used for the development of a sample quantitative bioassay based on growth inhibition. Attempts will be made to develop a simple indicator system for inhibition based on colorimetric, turbidimetric, or physical parameters.</p> <p>25. (U) 8305 - 8309. Methods for toxicity testing of yeast were developed. Nine yeast species have been screened for their sensitivity to T-2 toxin and to another protein synthesis inhibitor, cycloheximide. Methods development for GC analysis of trichothecenes in natural water samples is in progress.</p>							

DETAIL SHEET

TITLE: (U) Microbial Degradation and Yeast Bioassay of Trichothecene Mycotoxins

FUNDING HISTORY: PY - OK; CY - 51K; BY - 58K

PROBLEM DEFINITION: The purpose of the research is twofold. The first goal is to provide preventive medicine and intelligence personnel with estimates of the longevity of priority trichothecenes in surface waters. The second is to determine if it is feasible to use yeasts as a simple, inexpensive, and rapid assay and detection system for the trichothecenes.

IMPORTANCE: As chemical warfare agents, the 12,13-epoxytrichothecene mycotoxins have the potential to threaten the military effectiveness and health of field personnel. Decisions regarding the relative safety and the nature of treatment for contaminated surface waters will have to be made in the field by the responsible preventive medicine authorities. A data base addressing the longevity of the trichothecenes in natural waters as well as simple detection systems are essential in assessing the risk associated with the consumption of such water.

APPROACH: Pending the development of a method for the production of carbon-14 toxin or of chemical methods sufficiently sensitive for the analysis of low levels of the toxin in surface waters, local water samples will be incubated with the toxin. Levels of bacteria in the samples, uptake of the toxin by microorganisms, and levels of carbon dioxide produced by microbial action on the toxin will be measured throughout the course of the incubation period. Kinetic parameters for the rate of disappearance and turn-over of the toxin will be determined from the experimental data.

Yeast bioassays will be initiated by screening representative species of a diversity of yeast genera for their sensitivity to T-2 toxin. The most sensitive organism(s) will be used for the development of a simple quantitative bioassay based on growth inhibition. Moreover, attempts will be made to develop a simple indicator system for inhibition based on colorimetric, turbidometric, or physical parameters.

ACHIEVEMENTS: Methods for toxicity testing of yeast were developed. Nine yeast species have been screened for their sensitivity to T-2 toxin. Methods development for GC analysis of trichothecenes in natural water samples is in progress but the methods have been inadequate for the proposed fate studies. Efforts have been diverted to developing a method for the production of radiolabeled T-2 toxin so that the fate studies can be conducted in the future.

PRESENTATIONS: Microbial Fate and Yeast Bioassay of Trichothecene Mycotoxins, March 1983. DOD Toxin Defense Coordination Meeting, Aberdeen Proving Ground, Maryland.

MILITARY MEDICAL ENVIRONMENTAL QUALITY

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION*	2. DATE OF SUMMARY*	REPORT CONTROL SYMBOL	
				DA OB 6188	83 10 01	DD-DR&E(AR)636	
3. DATE PREV. SUMMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY*	6. WORK SECURITY*	7. REGRADING*	8. DISSEM INSTRN	9a. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. CODES*	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62720A	3E162720A835		AA	123	APC F691	
b. CONTRIBUTING							
XXXXXXXXXX	STOG 82/83-6, 2/2						
11. TITLE (Precede with Security Classification Code)*							
(U) Screening of Military Chemicals for Toxicity to Aquatic Organisms							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS*							
005900 Environmental Biology; 016800 Toxicology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
76 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER:				FISCAL YEAR		207	
c. TYPE:				CURRENT		183	
d. AMOUNT:				84		1.9	
e. KIND OF AWARD:				f. CUM. AMT.			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: van der Schalie, W H			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Lab Animals; (U) Munitions; (U) Fish							
(U) Aquatic Toxicology; (U) Hazardous Wastes; (U) Pesticides; (U) RAM III							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To provide aquatic toxicity data required in conjunction with in-house and extramural research related to munitions production. These data will help assess the hazard to aquatic organisms of Army-relevant materials and aid in the pollution abatement process at Army facilities.							
24. (U) To conduct aquatic toxicity testing through comparative screening tests and through generation of toxicity data; to evaluate state-of-the-art toxicity testing methods to determine applicability to research requirements; to advance the state-of-the-art in toxicity testing methods where research requirements cannot be met with existing methods.							
25. (U) 8210 - 8309. A technical report has been prepared on the toxicity of 1,3-dinitrobenzene (DNB), 1,3,5-trinitrobenzene (TNB), and 3,5-dinitroaniline (DiNA) to aquatic organisms. Testing with the propellant nitroguanidine (NGu) is nearly completed; toxicity of this material to the fish, invertebrates, and algae tested is quite low. NGu effects were seen only at concentrations of 1,500 mg/L or higher, if at all.							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Screening of Military Chemicals for Toxicity to Aquatic Organisms

FUNDING HISTORY: PY - 264K; CY - 207K; BY -183K

PROBLEM DEFINITION: This project is designed to provide data on the toxicity of munitions-related materials to aquatic organisms, including fish, aquatic invertebrates, and algae.

IMPORTANCE: Pollution control facilities at Army ammunition plants are currently being upgraded. The type and extent of treatment required for aqueous effluents will depend greatly on the toxicity of the effluent components to aquatic life. Generation of this toxicity information will aid in assessing the environmental hazard posed by the munitions-related materials found in these effluents.

APPROACH: Acute toxicity screening tests are used to identify the most sensitive of the species tested to the toxicants being evaluated. Further testing (fish early life stage tests and invertebrate chronic tests) is conducted with the sensitive species. If the toxicant is rapidly transformed in the aquatic environment due to photolysis, microbial action, etc., additional testing may be carried out with the transformation products to determine if they are more or less toxic than the original material.

ACHIEVEMENTS: Testing with 1,3-dinitrobenzene (DNB), 3,5-dinitroaniline (DiNA), 1,3,5-trinitrobenzene (TNB), and nitroguanidine (NGu) has been completed. A technical report has been prepared on the toxicity of DNB, DiNA, and TNB to aquatic organisms. Photolysis appears to increase the toxicity of NGu, and additional research has been initiated to further define the toxicity of photolyzed NGu.

PUBLICATIONS: van der Schalie, W.H. 1983. The Acute and Chronic Toxicity of 3,5-Dinitroaniline, 1,3-Dinitrobenzene, and 1,3,5-Trinitrobenzene to Freshwater Aquatic Organisms. Technical Report 8305. US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV. SUMMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62720A	3E162720A835		AA	154	APC F647	
b. CONTRIBUTING							
X-XXXXXXXXX STOG 82/83-6, 2/2							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Microbial Fate of Military-Relevant Petroleum Oil Fogs							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 010100 Microbiology; 012100 Organic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		83 09		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER: ^a				FISCAL YEAR		b. FUNDS (in thousands)	
c. TYPE				83		0.2	
d. AMOUNT:				CURRENT		21	
e. KIND OF AWARD:				84		0.0	
f. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Taylor, G W			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2340			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Diesel Fuel; (U) Fog Oil; (U) Biodegradation; (U) Microbial Fate; (U) Soil; (U) Water; (U) RAM III							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) To assess the literature and establish a data base on the biodegradation and environmental fate of fog oil obscurants (SGF-1 and SGF-2) generated by the US Army from diesel fuel and light lubricating oil. To limit the study to C ₉ to C ₂₉ hydrocarbons and their fate in soil and fresh water. To assess the data base and make conclusions and recommendations for further research.							
24. (U) The preparation of the data base assessment was divided into three phases. Phase I is a review of the current literature and data bases. Phase II is preparation of an outline of the data base assessment. Phase III is preparation of the final data base assessment document, conclusions and recommendations.							
25. (U) 8210 - 8309. Phase I was completed April 30, 1982. Phase II was completed June 30, 1982. Phase III will be completed upon publication of a Memorandum Report (MR 10-82).							

DETAIL SHEET

TITLE: (U) Microbial Fate of Military-Relevant Petroleum Oil Fogs

FUNDING HISTORY: PY - 91K; CY - 21K; BY - OK

PROBLEM DEFINITION: To prepare a current literature review on the biodegradation and environmental fate of petroleum fog oils and related substances. To limit the references to petroleum compounds in the 9-29C atom range and to fresh waters and nonestuarine soils. To develop conclusions and recommendations concerning research needs.

IMPORTANCE: The fog oils are a complex mixture of organic compounds some of which are toxic. The oil fog would be xenobiotic to the microbial ecosystems wherever it is deposited. There would be photooxidized compounds formed which the Surgeon General of the Army should be cognizant. In addition, there are persistent compounds formed during biotransformation of the oils which may be more toxic than the original oils.

APPROACH: An approach to the problem would be to follow EPA guidelines in testing for the fate of compounds covered by TSCA. In order to study any rate reactions, however, a "model oil" preparation should be used to permit analysis of the various components. Particular attention should be paid to the photooxidation products of oil fog.

ACHIEVEMENTS: A current data base has been assembled. A document has been prepared with an assessment of this information. Conclusions and recommendations were made.

PUBLICATION: Memorandum Report 10-82.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3 DATE PREV SUMMARY	4 KIND OF SUMMARY	5 SUMMARY SCTY ^a	6 WORK SECURITY ^a	7 REGRADING ^a	8A DISB'N INSTR'N	8B SPECIFIC DATA - CONTRACTOR ACCESS	9 LEVEL OF SUM A WORK UNIT
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10 NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY	62720A	3E162720A835		AA	156	APC F895	
B. CONTRIBUTING							
XXXXXX	STOG 82/83-6	2/2					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Nitroguanidine Wastewater Pollution Control Technology Development							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 012100 Organic Chemistry							
13 START DATE		14 ESTIMATED COMPLETION DATE		15 FUNDING AGENCY		16 PERFORMANCE METHOD	
82 10		84 10		DA		C. In-House	
17. CONTRACT GRANT				18 RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION		PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL YEAR		C. CURRENT	
C. TYPE		D. AMOUNT		83		0.8	
E. KIND OF AWARD		F. CUM. AMT.		84		0.7	
19 RESPONSIBLE DOD ORGANIZATION				20 PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering Research & Development Laboratory				NAME ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^a Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME ^a Burrows, W D			
TELEPHONE (301) 663-7685				TELEPHONE (301) 663-7207			
21 GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Nitroguanidine; (U) Guanidine Nitrate; (U) Wastewater; (U) Pollution Control; (U) RAM III							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) The objective is to analyze wastewaters generated during proveout of the Sunflower Army Ammunition Plant nitroguanidine facility and to predict potential pollution problems from the operation. This project relates to evaluation of public health and environmental health hazards associated with operation of Army ammunition plants.</p> <p>24. (U) Document review, site visits, and sampling and analysis will be employed to detect and quantitate pollutants unique to nitroguanidine manufacture.</p> <p>25. (U) 8210 - 8309. Literature review and preliminary sampling and analysis are covered in MR 3-83, "Nitroguanidine Wastewater Pollution Control Technology: Phase I Report."</p>							

DETAIL SHEET

TITLE: (U) Nitroguanidine Wastewater Pollution Control Technology Development

FUNDING HISTORY: PY - OK; CY - 49K; BY - 74K

PROBLEM DEFINITION: There is a need to analyze wastewaters generated during proveout of the Sunflower Army Ammunition Plant nitroguanidine facility and to predict potential pollution problems from the operation thereof.

IMPORTANCE: This project addresses hazards to the environment and public health associated with operation of Sunflower Army Ammunition Plant.

APPROACH: Document review, site visits, and sampling and analysis will be employed to detect and quantitate pollutants unique to nitroguanidine manufacture.

ACHIEVEMENTS: Methods have been developed for analysis of nitroguanidine, guanidine, cyanoguanidine, nitrosoguanidine, melamine, and ammeline in Sunflower wastewaters. Methods for removal/destruction of these materials are under investigation.

PUBLICATIONS/PRESENTATIONS: None.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DA OG 9213	83 09 30	DD-DR&E(AR)636	
3 DATE PREV SUMMARY	4 KIND OF SUMMARY	5 SUMMARY SCTY ^a	6 WORK SECURITY ^a	7 REGRADING ^a	8A DISSEM INSTRN	8B SPECIFIC DATA - CONTRACTOR ACCESS	9 LEVEL OF SUM
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10 NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
A. PRIMARY	62720A	3E162720A835		AA	158	APC F877	
B. CONTRIBUTING							
C. CONTRIBUTING							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Treatment of Nitramines and Nitrobodyes							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 012100 Organic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		83 09		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER ^a				FISCAL		8	
C. TYPE				YEAR		0.1	
D. AMOUNT:				CURRENT		0.0	
E. KIND OF AWARD:				84		0	
20. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering Research & Development Laboratory				NAME ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS ^a Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME. Trudeau, T L				NAME ^a Burrows, W D			
TELEPHONE (301) 663-7685				TELEPHONE (301) 663-7207			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) RDX; (U) HMX; (U) TNT; (U) TAX; (U) SEX; (U) Ozone; (U) RAM III							
23. TECHNICAL OBJECTIVE ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) The purpose of this effort is to investigate methods for destruction of nitramines/nitrobodyes in wastewaters from munitions manufacture. This study relates to evaluation of the public health and environmental health hazards associated with discharge of wastewater at Holston Army Ammunition Plant.</p> <p>24. (U) Water samples containing RDX, HMX, TAX, SEX, or TNT will be treated by means of carbon adsorption, UV-ozone, hydrogen peroxide, or corona discharge.</p> <p>25. (U) 8210 - 8309. All studies are complete. Competition for carbon adsorption sites by the various munitions suggests limited applicability of this method for treatment of wastewaters. Corona discharge studies demonstrate destruction of all munitions, though power requirements may be substantial. Ultraviolet radiation alone will destroy nitramines readily, and will destroy TNT in combination with ozone or hydrogen peroxide. Power requirements are substantial, but within reason. Technical Reports 8209, 8215, 8306, and 8308 address carbon adsorption, corona oxidation, UV-ozone, and UV-peroxide, respectively.</p>							

DETAIL SHEET

TITLE: (U) Treatment of Nitramines and Nitrobodyes

FUNDING HISTORY: PY - 67K; CY - 8K; BY - OK

PROBLEM DEFINITION: The need exists to evaluate tertiary treatment modes for wastewater emanating from the Industrial Liquid Waste Treatment Facility at Holston AAP. There are no programs currently in progress to develop and/or evaluate technologies for the abatement of nitramine/nitrobody pollution. Programs are in progress to develop alternative technologies for the abatement of nitrobody (TNT, RDX/HMX) pollution at reduced cost, but their applicability for the treatment of nitramines is not known.

IMPORTANCE: Holston Army Ammunition Plant (HSAAP) will produce 125 million gallons of wastewater per day at full mobilization. The current design for the Industrial Liquid Waste Treatment Facility at HSAAP does not provide a tertiary mode of treatment for the removal of pollutant chemicals which survive primary and secondary treatment. There is evidence that RDX, HMX, and TNT, as well as biproduct nitramines will survive secondary biological treatment, and may adversely affect aquatic organisms in receiving waters. A problem is foreseen in complying with proposed ambient criteria.

APPROACH: Water samples containing TNT, RDX, HMX, TAX, and SEX will be subjected, alone and in combination, to treatment by carbon adsorption, corona oxidation, UV-ozone, and UV-hydrogen peroxide.

ACHIEVEMENTS: The final report for carbon adsorption has been published. Corona oxidation studies are in press, and UV-ozone and UV-hydrogen peroxide studies are complete and reports are in review.

PUBLICATIONS: Burrows, W.D. 1982. Tertiary Treatment of Effluent from Holston AAP Industrial Liquid Waste Treatment Facility. I. Batch Carbon Adsorption Studies: TNT, RDX, HMX, TAX, and SEX. Technical Report 8207, AD A121244. US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD.

Kobylinski, E.A. and W.D. Burrows. 1983. Tertiary Treatment of Effluent from Holston AAP Industrial Liquid Waste Treatment Facility. II. Corona Oxidation Studies: TNT, RDX, HMX, TAX, and SEX. Technical Report 8215. US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3. DATE PREV SUMRY 82 10 01	4. KIND OF SUMMARY D. CHANGE	5. SUMMARY SCY ^a U	6. WORK SECURITY ^a U	7. REGRADING ^a	8. DISSEM INSTR ^a NL	9. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10. LEVEL OF SUM A. WORK UNIT
10. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		62720A		3E162720A835		AA 159	
B. CONTRIBUTING						WORK UNIT NUMBER APC F878	
XXXXXXXXXX		STOC 82/83-6, 2/2					
11. TITLE (Precede with Security Classification Code) ^a (U) Evaluate Dimethylnitrosamine							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 007800 Hygiene and Sanitation; 012100 Organic Chemistry							
13. START DATE 81 10		14. ESTIMATED COMPLETION DATE 84 10		15. FUNDING AGENCY DA		16. PERFORMANCE METHOD C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE.				PRECEDING		B. FUNDS (In thousands)	
B. NUMBER *				FISCAL YEAR		C. CURRENT	
C. TYPE				83		0.2	
D. KIND OF AWARD				84		0.3	
E. AMOUNT						28	
F. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME * US Army Medical Bioengineering Research & Development Laboratory ADDRESS * Fort Detrick, Frederick, MD 21701				NAME * US Army Medical Bioengineering Research & Development Laboratory ADDRESS * Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL NAME: Trudeau, T L TELEPHONE (301) 663-7685				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution) NAME * Burrows, W D TELEPHONE (301) 663-7207 SOCIAL SECURITY ACCOUNT NUMBER			
21. GENERAL USE Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS NAME: NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) RDX; (U) HMX; (U) TNT; (U) Biodegradation; (U) RAM III							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) The objective is to provide analytical support to contract DAMD17-81-C-1118 (Bell, George Washington University), which concerns munitions wastewater treatment in semi-continuous activated sludge treatment systems. This study relates to evaluation of the public health and environmental health hazards associated with discharge of wastewater at Holston Army Ammunition Plant. 24. (U) Methods will be developed for analysis of RDX, HMX, and TNT in wastewater using HPLC. Samples provided by the contractor will be analyzed. Satisfactory analytical methods have been developed. 25. (U) 8210 - 8309. Methods have been developed for analysis of RDX, HMX, and TNT down to detection levels of 0.29 mg/L, 0.29 mg/L, and 0.25 mg/L, respectively, as well as for the byproduct nitramines TAX and SEX, for which detection levels are 0.33 mg/L. Detection of dimethylnitrosamine by thermal electron analysis is under investigation.							

DETAIL SHEET

TITLE: (U) Evaluate Dimethylnitrosamine

FUNDING HISTORY: PY - 53K; CY - 4K; BY - 28K

PROBLEM DEFINITION: The objective of this effort is to provide analytical support to contract DAMD 17-81-C-1118 (Bell, George Washington University), which concerns munitions wastewater treatment in semicontinuous activated sludge treatment systems for particular use in the manufacture of Composition B.

IMPORTANCE: This study relates to evaluation of the public health and environmental health hazards associated with discharge of wastewater at Holston Army Ammunition Plant.

APPROACH: Methods will be developed for analysis of RDX, HMX, and TNT in wastewater using HPLC. Samples provided by the contractor will be analyzed once satisfactory analytical methods have been developed.

ACHIEVEMENTS: Satisfactory HPLC methods have been developed for RDX, HMX, and TNT, as well as two co-products, TAX, and SEX.

PUBLICATION: Brueggemann, Ernst E. 1983. HPLC Analysis of SEX, HMX, TAX, RDX, and TNT in Wastewater. Technical Report 8206, AD A127348. US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)636	
3. DATE PREV. SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
82 10 01	D. CHANGE	U	U		NL		
10. NC CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	62720A	3E162720A835	AA	160 APC F891			
b. CONTRIBUTING							
XXNNNNNNNN STOG 82/83-6, 2/2							
11. TITLE (Precede with Security Classification Code) ^a							
(U) Treatment of Munition Production Wastes							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 012100 Organic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 03		84 06		DA		C. In-House	
17. CONTRACT GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER ^a				FISCAL YEAR		83	
c. TYPE				CURRENT		0.1	
d. AMOUNT						28	
e. KIND OF AWARD				84		0.4	
f. CUM. AMT.						50	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: Burrows, W D			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-7207			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC: DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) RDX; (U) HMX; (U) TNT; (U) Wastewater; (U) (TAX); (U) (SEX); (U) RAM III							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) The objectives are to review the design basis for the Holston Army Ammunition Industrial Liquid Waste Treatment Plant, scheduled to become operational in 1st QTR FY83; to model waste treatment methodologies with respect to removal of possible hazardous components; and to anticipate any operational problems. This project relates to evaluation of public health and environmental health hazards associated with operation of Army ammunition plants.</p> <p>24. (U) A literature survey, site visit, and modeling will be used to design bench scale and pilot scale wastewater test facilities.</p> <p>25. (U) 8210 - 8309. A draft report has been prepared in collaboration with Dr. Robert Carnahan of the University of South Florida (DAMD17-82-C-2258).</p>							

DETAIL SHEET

TITLE: (U) Treatment of Munition Production Wastes

FUNDING HISTORY: PY - OK; CY - 28K; BY - 50K

PROBLEM DEFINITION: There is a need to review the design basis for the Holston Army Ammunition Plant industrial liquid waste treatment plant, scheduled to become operational in 1st Qtr FY84, to model waste treatment methodologies with respect to removal of possibly hazardous components, and to anticipate any operational problems.

IMPORTANCE: This project addresses hazards to the environment and public health associated with operation of Holston Army Ammunition Plant.

APPROACH: A literature survey, site visit, and modeling will be used to design bench-scale and pilot-scale wastewater test facilities.

ACHIEVEMENTS: A computer model has been developed and verified in part using start-up data at Holston.

PUBLICATIONS/PRESENTATIONS: None.

CARE OF COMBAT CASUALTY

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E/AK 1636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	62772A	3S162772A874	BA	221 APC F718			
B. CONTRIBUTING							
C. CONTRIBUTING	STOG 82/83-6.2/4						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Refrigerator, Medical, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 013300 Protective Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 10		CONT		DA		C. In-House	
17. CONTRACT / GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING			
B. NUMBER: ^a				FISCAL YEAR		B. FUNDS (in thousands)	
C. TYPE:		D. AMOUNT:		CURRENT			
E. KIND OF AWARD:		F. CUM. AMT.					
				83		0.2	
				84		0.7	
						30	
						84	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a O'Connor, R J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Biological Refrigerator; (U) Medical Refrigerator; (U) Biological Storage; (U) Blood Storage; (U) RAM II							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Identify a replacement item for the biological refrigerator that is currently in the military inventory (NSN 4110-00-707-2550) but is no longer supportable.							
24. (U) Locate a suitable commercially produced item that will satisfy requirements or that can be made to do so with minor modification. A new development effort will be undertaken if a suitable item is unavailable.							
25. (U) 8210 - 8309. A refrigerator employing a thermoelectric system and configured specifically for field application was supplied by the vendor and was evaluated. The device showed promise of satisfying the required characteristics and was designed for low maintenance. Two of the units were procured by USAMMA for further evaluation by this Laboratory. Field user evaluation is scheduled for 2nd Quarter FY 84.							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Refrigerator, Medical, Field

FUNDING HISTORY: PY - 28K; CY - 30K; BY - 84K

PROBLEM DEFINITION: The biological refrigerator currently in the inventory (NSN 4110-00-707-2550) is said to be no longer supportable primarily due to high acquisition costs and cost of replacement parts.

IMPORTANCE: A refrigerator for the storage of perishable medical supplies is a necessity for field military units. Special requirements, such as the need to store whole blood, and the rugged operating environment eliminate many available commercial units from consideration.

APPROACH: The commercial market will be canvased for equipment that meets the required performance characteristics and that can be ruggedized to meet environmental and handling requirements. At the same time, consideration will be given to modernizing the current design to make it more easily and cheaply procurable.

ACHIEVEMENTS: Two commercial units have been identified that could possibly meet requirements with some modifications. Consideration has also been given to upgrading the current military model to make it supportable. A new thermoelectric model has surfaced that is designed specifically for military use. This unit shows substantial potential for satisfying the requirements, and an engineering evaluation was conducted. Two additional units were secured by USAMMA for evaluation by this Laboratory. User evaluation is planned for early 1984.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)636	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10. LEVEL OF SUM A. WORK UNIT
82 10 01	H. TERMINATION	U	U		NL		
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	62772A	3S162772A874	BA	222 APC F719			
b. CONTRIBUTING							
c. XXXXXXXXXX	STOG 82/83-5.2/4						
11. TITLE (Precede with Security Classification Code) ^a (U) Sterilizer, Surgical Instrument and Dressing							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
a. NUMBER: ^a				FISCAL		83	
c. TYPE:				YEAR		2.0	
d. AMOUNT:				CURRENT		165	
e. KIND OF AWARD:						0.0	
f. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Prensky, W C			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Salisbury, L L			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Sterilizer, Field; (U) Sterilizer, Dental; (U) Sterilizer, Veterinary; (U) Sterilizer, Small; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Identify a small table-top sterilizer to replace the standard military sterilizers (NSN 6530-00-782-6503, NSN 6530-00-926-4857, and NSN 6530-00-926-2022) which are no longer supportable.							
24. (U) Canvas the market for a commercial item that is suitable or requires only minor modification. If this approach should fail, a new development effort may be undertaken.							
25. (U) 8210 - 8309. No further progress has been made on this task as it has remained in holding status awaiting reevaluation of requirements by the Combat Developer. This task has therefore been terminated.							

DETAIL SHEET

TITLE: (U) Sterilizer, Surgical Instrument and Dressing

FUNDING HISTORY: PY - 67K; CY - 165K; BY - 0

PROBLEM DEFINITION: Three small tabletop sterilizers for field use (NSN 6530-00-782-6503, 6530-00-926-4857, and 6530-00-926-2022) are of aging designs and are no longer supportable. These units serve aid stations, field dental facilities, field laboratories, and the like. A need exists for a single small sterilizer, supportable in a field environment, to replace these obsolete units.

IMPORTANCE: A sterilization capability in small field medical elements such as those mentioned above is a necessity. The substitution of a single satisfactory item for the three separate units currently in stock will greatly improve the logistical support situation relative to this class of equipment while simultaneously allowing a move up to current technology.

APPROACH: The commercial market will be canvased for an item that is suitable or requires only minor modification. If this approach should fail, a new development effort may be undertaken.

ACHIEVEMENTS: A preliminary evaluation was conducted on one commercial electrically powered unit, and the results were promising. The Combat Developer advises, however, that sterilizer requirements relative to the battalion aid station are undergoing study and probable revision. This task has been terminated pending the outcome of that review.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD FORM 1498A	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	8a. SPECIFIC DATA CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
a. PRIMARY	62772A	3S162772A874		BA		223 APC F730	
b. CONTRIBUTING							
c. XXXXXXXXXX	STOG 82/83-6.274						
11. TITLE (Precede with Security Classification Code) ^a							
(U) System for Medical Gas Generation							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 008800 Life Support; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
82 01		85 12		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.7	
d. AMOUNT:						75	
e. KIND OF AWARD:				84		1.2	
f. CUM. AMT.						97	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Prenskey, W C			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Medical Gases; (U) Field Gas Generation; (U) Life Support; (U) Hospital Equipment; (U) RAM II							
23. (U) Develop the concept and requirements for generation of medical gases (principally oxygen) in the field, thus negating the need for moving large numbers of high pressure gas bottles through the supply system to forward areas.							
24. (U) Assess existing technology and generate the necessary requirements to support the letting of a contract for the development of a gas generating system for field use.							
25. (U) 8210 - 8309. A letter of agreement has been signed for an on-site medical oxygen generating and distribution system. A draft work statement for the contract effort has been prepared.							

DETAIL SHEET

TITLE: (U) System for Medical Gas Generation

FUNDING HISTORY: PY - 36; CY - 75K; BY - 97K

PROBLEM DEFINITION: The need for medical gases on an OCONUS battlefield presents a logistical problem of large magnitude. The transport of large numbers of high pressure gas cylinders to a foreign theater of operations and the distribution of those cylinders within the theater directly conflict with the need to move large quantities of ammunition and other combat hardware and may, in fact, not be possible when combat operations are under way.

IMPORTANCE: The ability to produce at least some of the required medical gases on site could alleviate the logistical conflict between gas cylinders and combat materiel and may, in fact, be the only way to insure an adequate supply of these gases for treatment of combat casualties.

APPROACH: Oxygen and nitrogen constitute the greatest volume of the medical gases required, and a ready source for these exists in the atmosphere itself. Thus, the task effort will concentrate on producing these gases through dissociation of air.

ACHIEVEMENTS: A letter of agreement has been signed for an on-site medical oxygen generating and distribution system. A draft statement of work is being prepared prior to soliciting industry.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG9206	83 10 01	DD DR&E AR 1498	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA: CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
A. PRIMARY		62772A		3S162772A874		BA	
B. CONTRIBUTING						226 APC F731	
C. CONTRIBUTING		STOG 82/83-6.274					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pyrogen-Free Integrated System Support							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 003500 Clinical Medicine							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:		EXPIRATION:		PRECEDING		B. FUNDS (in thousands)	
B. NUMBER ^a				FISCAL YEAR		83	
C. TYPE:		D. AMOUNT:		CURRENT		2.6	
E. KIND OF AWARD:		F. CUM. AMT.				185	
				84		2.0	
						178	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Reams, W H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Pyrogen-free Water; (U) Injectables;							
(U) Reconstitution; (U) Clinical Medicine; (U) RAM II							
23. TECHNICAL OBJECTIVE. ^a 24. APPROACH. 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Supply pyrogen-free water for use in injectable, intravenous, and other field medical applications.							
24. (U) Investigate various commercial and laboratory methods for the production of sterile pyrogen-free water. Methods of coupling the output of the system to suitable containers for distribution will be examined.							
25. (U) 8210 - 8309. A prototype system has been assembled, and components are being optimized. Sterile docking methods are being investigated. An on-line limulus amoebocyte lysate (LAL) test is being designed.							

DETAIL SHEET

TITLE: (U) Pyrogen-Free Integrated System Support

FUNDING HISTORY: PY - 48; CY - 185K; BY - 178K

PROBLEM DEFINITION: Currently, pyrogen-free water for reconstituting blood substitutes, injectables, and the lavage of wounds must be obtained from commercial sources and shipped into combat areas. This logistic burden could be eliminated or greatly reduced if pyrogen-free water could be produced on site.

IMPORTANCE: The availability of pyrogen-free water in a combat area is of extreme importance. The reconstitution of blood substitutes, injectables, and the lavage of wounds all require pyrogen-free water.

APPROACH: Current reverse osmosis technology, coupled with the limulus amebocyte lysate (LAL) test for pyrogenicity, will be investigated. Commercial sources will be surveyed for availability of field compatible equipment.

ACHIEVEMENTS: A prototype system has been assembled, and components are being optimized. Sterile docking methods are being investigated. An on-line LAL test apparatus is being designed.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL	
				DAOG9204	83 10 01	DD DR&F A-100	
3. DATE PREV. SUMM ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB ^a INSTR ^a	8B. SPECIFIC DATA CONTRACTOR ACCESS ^a	9. LEVEL OF SUM ^a
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. CODES ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		62772A		3S162772A874		BA 227 APC F732	
b. CONTRIBUTING							
c. CONTRIBUTING		STOG 82/83-6.274					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Digital Radiography							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 003500 Clinical Medicine							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE			
a. DATES/EFFECTIVE:				b. PRECEDING			
c. NUMBER:				FISCAL YEAR			
d. TYPE:				e. CURRENT			
f. KIND OF AWARD:				g. FUND (In thousands)			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: Salisbury, L L			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) X-Ray System; (U) Digital Radiography; (U) Imaging, Medical; (U) Teleradiography; (U) RAM II							
23. TECHNICAL OBJECTIVE ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop a digital radiographic/fluoroscopic system for field use. The elimination of film, film processor, and chemicals will do much to minimize the logistic burden associated with the use of conventional X-ray systems in a military medical environment.</p> <p>24. (U) Using commercial, modified commercial, and in-house developed subsystems, develop a detector, digital processor, display, and recording system for the acquisition, display, recording, and transmission of radiographic information.</p> <p>25. (U) 8210 - 8309. A contract has been let for the development of a solid state detector. This detector will have micro channels filled with scintillating material to provide sensitivity while minimizing photon scatter.</p>							

^a Available to contractors upon originator's approval

DD FORM 1498

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A 1 NOV 65 AND 1498-1 1 MAR 66 (FOR ARMY USE) ARE OBSOLETE

U.S. GOVERNMENT PRINTING OFFICE 1982 - 361-646/8346

DETAIL SHEET

TITLE: (U) Digital Radiography

FUNDING HISTORY: PY - 40K; CY - 75K; BY - 78K

PROBLEM DEFINITION: Currently available radiographic equipment requires a large amount of support equipment and supplies (film, processor, water, chemicals, etc.). Technology exists that would permit the elimination of these support items and provide the capability of telemetering the radiographic information from remote locations.

IMPORTANCE: The importance of reducing the logistic burden in a combat area is well documented. In addition, the elimination of shelf life items reduces the problem of stockage during peacetime.

APPROACH: Using solid-state detectors, microprocessor data handling, magnetic storage media, and video display technology, a system concept will be developed. Commercial sources will be investigated, and a system will be implemented.

ACHIEVEMENTS: A contract has been let for the development of a new detector. This detector will use micro channels filled with scintillating material to provide sensitivity while minimizing photon scatter.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD FORM 1498 1 NOV 65	
				DAOB6248	83 10 01		
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9. SPECIFIC DATA - CONTRACTOR ACCESS	10. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
11. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62772A	3S162772A874		BA	228 APC F713		
b. CONTRIBUTING							
c. XXXXXXXX	STOG 82/83-5.2/4						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Protective Containers, Field, Medical Devices							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
78 12		85 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE			
a. DATES/EFFECTIVE:				PRECEDING			
b. NUMBER:				FISCAL YEAR			
c. TYPE:				CURRENT			
d. KIND OF AWARD:				83			
e. CUM. AMT.				84			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: Arnold, M F			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				ASSOCIATE INVESTIGATORS			
Foreign Intelligence Not Applicable				NAME: Reams, W H			
				NAME: POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code) (U) Container; (U) Protective Container; (U) Field Chest; (U) Medical Chest; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Design a family of strong, lightweight containers for fragile medical equipment that is presently authorized to field medical units. This containerization program will assure that equipment developed by this Laboratory is received in good working order and will also reduce packaging time.</p> <p>24. (U) Identify physical characteristics of existing items to be protected. Determine similarities and then design a container or containers with various inserts to protect the items during handling, shipping, and storage.</p> <p>25. (U) 8210 - 8309. One hundred and fifty items requiring packaging have been identified, and a family of four containers has been selected to accept these items or a combination of items. Contracts to purchase sample containers will be initiated in the 1st Quarter FY 84.</p>							

DETAIL SHEET

TITLE: (U) Protective Containers, Field, Medical Devices

FUNDING HISTORY: PY - 43K; CY - 38K; BY - 118K

PROBLEM DEFINITION: To design a family of strong, lightweight shipping containers for fragile medical equipment issued to field medical units.

IMPORTANCE: The protection of the sensitive medical equipment is essential during loading, transportation, and unloading when being deployed in field locations. This equipment, properly protected, must be available for immediate use in patient care. If unprotected, the equipment may be damaged or misaligned requiring extensive repair or recalibration.

APPROACH: Medical equipment that requires packaging will be identified. The level of protection required will be determined. A family of containers to accept this equipment will be designed, purchased, and tested.

ACHIEVEMENTS: A review was made of the packing instructions for the following medical areas: intensive care ward, surgical ward, pharmacy, evacuation medical supplies, combat support hospital medical supplies, ear-nose-throat clinic, patient ward, patient receiving clinic, orthopedic ward, emergency treatment, and oral surgery. A list of 150 pieces of equipment requiring packing resulted. Similarity in size of many pieces of equipment allowed this list to be reduced to 54 item sizes. Examination of a computer ordering of these 54 sizes indicated that a family of 6 containers would efficiently accept each item or combination of items. Further adjustment of container dimensions reduced this number to four sizes of containers. Containers for items that require shock protection will be provided with a shock absorbing platform. The same family of four case sizes will also be provided without the shock platform for the storage of bulk items not requiring this protection. Information provided by manufacturers of some of the more delicate items was used to determine the level of shock protection required. Containers made by rotationally molding high density polyethylene appear to be the most suitable at this time. Contracts to purchase sample containers from various manufacturers will be initiated in the 1st Quarter FY 84.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1 AGENCY ACCESSION ^a	2 DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD DR&F A-16-16	
3 DATE PREV SUMMARY	4 KIND OF SUMMARY	5 SUMMARY SCTY ^a	6 WORK SECURITY ^a	7 REGRADING ^a	8A DISSEM INSTR ^a	8B SPECIFIC DATA CONTRACTOR ACCESS	9 LEVEL OF SUM A WORK UNIT
82 10 01	H. TERMINATION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10 NO CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	62772A	3S162772A874	BA	232 APC F793			
B. CONTRIBUTING							
C. XXXXXXXXXX	STOG 82783-6.274						
11 TITLE (Precede with Security Classification Code) ^a							
(U) Tactical Ambulance Adaptation, Feasibility Study of							
12 SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13 START DATE		14 ESTIMATED COMPLETION DATE		15 FUNDING AGENCY		16 PERFORMANCE METHOD	
77 05		83 09		DA		C. In-House	
17 CONTRACT GRANT				18 RESOURCES ESTIMATE		19 PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		FUND\$ (in thousands)	
B. NUMBER ^a				FISCAL YEAR		CURRENT	
C. TYPE				83		0.1	
D. KIND OF AWARD				84		0.0	
E. AMOUNT:				0			
F. CUM. AMT.							
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering Research & Development Laboratory				NAME: US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: Fort Detrick, Frederick, MD 21701				ADDRESS: Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: Conway, W H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21 GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22 KEYWORDS (Precede EACH with Security Classification Code) ^a							
(U) Ambulance; (U) Tactical Ambulance; (U) Emergency Medical Vehicle; (U) Medical Transport; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) Conduct a study of the Army's needs in tactical ambulances and their capabilities in preparation for the next major procurement.							
24. (U) Initiate a study program to identify the number and type of vehicles needed, the required medical capabilities of each, and the logistical implications. The results of this study will be a comprehensive requirements document.							
25. (U) 8210 - 8309. Efforts to field the stabilized litter rack for the M113 ambulance and to develop the Fighting Vehicle System (FVS) mobile aid station were unsuccessful because funds for ultimately fielding this equipment are unavailable.							

DETAIL SHEET

TITLE: (U) Tactical Ambulance Adaptation, Feasibility Study of

FUNDING HISTORY: PY - 52K; CY - 17K; BY - 0

PROBLEM DEFINITION: To assist the Combat Developer in determining the level of medical treatment that can practically be provided in tactical ambulances by studying items of equipment and layout of tactical vehicles for compatibility.

IMPORTANCE: The "Division 86" study has mandated expansion of the level of medical treatment in the forward area including ambulance vehicles. In view of the decision that tactical ambulances will be adaptations of combat vehicles, it becomes important to know what equipment can be utilized in those vehicles and how well the medical personnel can function with the equipment in place.

APPROACH: Specimen tactical vehicles will be procured and equipped as medical treatment/evacuation vehicles based on guidance from the Combat Developer and medical consultants. These trial configurations will then be evaluated for functional practicability, and the results will be transmitted for use in "Division 86" or other studies.

ACHIEVEMENTS: It has been determined that the M113A1 will be the principal front-line ambulance in the future. A specimen M113A1 hull has been procured, equipped with stabilized litter racks, and provisioned with the medical equipment specified by the Academy of Health Sciences. The data generated has been presented to the Academy, and this Laboratory has been supporting the Academy in the integration of these concepts into the medical system. However, efforts to field the stabilized litter rack for the M113 ambulance and to develop the Fighting Vehicle System (FVS) mobile aid station have been unsuccessful because funds for ultimately fielding this equipment are unavailable.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E (AR) 16 16	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISSEM INSTR ^a	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	K. COMPLETION	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
A. PRIMARY	62772A	3S162772A874	BA	235 APC F798			
B. CONTRIBUTING							
C. CONTRIBUTING	CARDS NO: 1437R						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Apparatus, X-Ray, Dental, Field							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002400 Bioengineering; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
80 05		83 06		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING		B. FUNDS (in thousands)	
B. NUMBER:				FISCAL YEAR		83	
C. TYPE:				CURRENT		0.1	
D. AMOUNT:				84		0.0	
E. KIND OF AWARD:				F. CUM. AMT.		0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Malek, J W			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7277			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) X-Ray; (U) Field Medicine; (U) Field Equipment;							
(U) Dental X-Ray; (U) Low Dose X-Ray; (U) Dental Apparatus; (U) RAM IV							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number precede text of each with Security Classification Code)							
23. (U) Obtain a low capacity radiographic apparatus suitable to meet the requirements of portability for Army field dental units.							
24. (U) Evaluate commercial sources for a functional device that can be adapted to meet the requirements.							
25. (U) 8210 - 8309. The contractor agreed to make all modifications required by the US Army. Data was presented at an IPR on 7 December 1982. The IPR recommended that the commercial prototype be type classified as Standard A.							

DETAIL SHEET

TITLE: (U) Apparatus, X-Ray, Dental, Field

FUNDING HISTORY: PY - 56K; CY - 6K; BY - 0

PROBLEM DEFINITION: New Federal Drug Administration (FDA) regulations preclude use of previous X-ray units in field units, necessitating investigation of new X-ray units that will meet these regulations.

IMPORTANCE: Current field dental TOE units do not have an authorized/certified X-ray unit.

APPROACH: Commercial sources will be searched for devices that will meet the requirements.

ACHIEVEMENTS: Radiation leakage tests and a modified DT I were completed. Operational Testing I of a single commercial prototype was completed. An IPR held on 7 December 1982 recommended that the prototype be type classified. All data for the type classification action were forwarded in February 1983. This task has been successfully completed.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK) 16.16	
3. DATE PREV. SUMMARY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	8b. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	62772A	3S162772A874	BA	236 APC F794			
b. CONTRIBUTING							
c. EXPERIMENTAL	STOG 82/83-6.2/4						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Field Gurney							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
80 09		84 06		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PREVIOUS		b. FUNDS (in thousands)	
b. NUMBER ^a				83		0.2	
c. TYPE:				FISCAL YEAR		16	
d. KIND OF AWARD:				CURRENT		0.9	
e. AMOUNT:				84		104	
f. CUM. AMT.							
19. RESPONSIBLE OOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a : US Army Medical Bioengineering Research & Development Laboratory ADDRESS ^a : Fort Detrick, Frederick, MD 21701				NAME ^a : US Army Medical Bioengineering Research & Development Laboratory ADDRESS ^a : Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic institution)			
NAME: Trudeau, T L				NAME ^a : Thayer, C R			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7527			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Conway, W H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Mobile Litter; (U) Litter Carrier; (U) Wheeled Litter; (U) Standard Army Litter; (U) RAM II							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop a device that enables a standard Army litter to be converted into a wheeled "Gurney" type of patient conveyance that can be moved over field terrain by one or, at most, two litter bearers. The purpose is to reduce the number of personnel required in field hospitals to move patients and to facilitate the use of female soldiers in the role of litter bearer.</p> <p>24. (U) Procure and evaluate specimens of foreign equipment that address this need and are known to exist. Failing that, a new development effort will be undertaken.</p> <p>25. (U) 8210 - 8309. A West German litter cart had been procured and evaluated from an engineering standpoint. This unit showed promise with incorporation of a few modifications, and these were made on an experimental basis. An aluminum version of the West German device was fabricated in an effort to lighten the weight, and a set of snap-on wheel cleats were developed to provide a soft terrain capability. Engineering development tests are being conducted on both versions. Efforts to provide a suitable lightweight tire for the Gurney are continuing.</p>							

DETAIL SHEET

TITLE: (U) Field Gurney

FUNDING HISTORY: PY - 62K; CY - 16K; BY - 104K

PROBLEM DEFINITION: In a mass-casualty situation, the need to move litter patients between the dispersed elements of a field hospital or clearing station would put a severe strain on the available manpower. A conveyance is needed to reduce the number of litter bearers required per carry from four to not more than two, and preferably one.

IMPORTANCE: The intense combat predicted by current European scenarios indicates that mass-casualty situations at field hospitals will be a more common occurrence. This fact, coupled with increased use of female soldiers in roles such as litter bearer, makes it necessary to reduce to a minimum the manpower required for the movement of litter patients in and around field treatment facilities and to lessen the physical demands made on litter bearers.

APPROACH: A wheeled litter carrier will be developed, after the fashion of a hospital Gurney, that is capable of being operated over moderately rough terrain by one, or not more than two, litter bearers of unremarkable physical stature.

ACHIEVEMENTS: A test bed was constructed to evaluate various wheel configurations operating on different types of terrain. Also, a West German wheeled litter carrier was procured and evaluated for this application. The West German device, which was designed for field military use, has a number of excellent features but is made of steel and uses Moped wheels. Studies have been made to lighten the device and to provide a wheel configuration having greater surface contact. Engineering tests are presently being conducted.

PUBLICATIONS/PRESENTATIONS: None

MEDICAL DEFENSE AGAINST INFECTIOUS DISEASES

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)616	
3. DATE PREV SUMRY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REG. ADRG	8A. DISB'N INSTR' ^a	8B. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO./CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER	
A. PRIMARY	62770A	3M162770A870		CB		261 APC F901	
B. CONTRIBUTING	62770A	3M162770A871		CB			
C. CONTINUING	STOG 82/83-6.2/3						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Vector Control Methods, Material, Equipment							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
002600 Biology; 009800 Medical and Hospital Equipment							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 10		84 10		DA		C. Ir-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		A. PROFESSIONAL MAN YRS	
A. DATES/EFFECTIVE:				PRECEDING			
B. NUMBER ^a				FISCAL		83	
C. TYPE:				YEAR		0.9	
D. KIND OF AWARD:				84		1.1	
E. CUM. AMT.						52	
F. CUM. AMT.						68	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME ^a US Army Medical Bioengineering				NAME ^a US Army Medical Bioengineering			
Research & Development Laboratory				Research & Development Laboratory			
ADDRESS ^a Fort Detrick, Frederick, MD 21701				ADDRESS ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME ^a Nelson, J H			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Buescher, M D			
				NAME: Pierce, P E			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Vector Control; (U) Equipment; (U) Methodology; (U) Surveillance; (U) RAM I							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop threat projections, technological forecasts, and interagency planning to determine operational capabilities, doctrine, organization, and potential systems to meet Army vector control needs.</p> <p>24. (U) Investigate and analyze pertinent studies on vector control systems and develop and evaluate experimental and commercial hardware and control formulations to develop strategies for control of militarily important vectors.</p> <p>25. (U) 8210 - 8309. The first operational evaluation of the aerial pesticide unit with solid and liquid dispersal capability was conducted in California for disease vector control against <u>Culex tarsalis</u> and <u>Anopheles freeborni</u>. Results indicated that good control of these vectors in different habitats was possible using Baygon[®] wettable powder and technical grade malathion. Similarly, a test was conducted in Arizona against <u>Cx. tarsalis</u> using Abate[®] granules as a larvacide.</p>							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Vector Control Methods, Material, Equipment

FUNDING HISTORY: PY - 5K; CY - 52K; BY - 68K

PROBLEM DEFINITION: Development of threat projections, technological forecasts, and extensive interagency planning to determine operational capability, doctrine, organization, and potential systems is essential to meet the needs of the Army. The basis for future investigations must be established, and concept formulation must be initiated through early on studies of vector control systems development, and evaluation of experimental and commercial hardware.

IMPORTANCE: Identification and resolution of technical issues, operational issues, and logistical support problems are critical to the timely incorporation of new methodology, materials, and equipment into the Army's vector control program.

APPROACH: Pertinent studies on vector control systems, development and evaluation of experimental and commercial hardware, and control formulations will be analyzed and investigated to develop strategies for control of vectors of military importance.

ACHIEVEMENTS: The first operational evaluation of the aerial pesticide dispersal unit with solid and liquid dispersal capability was conducted in California for disease vector control against Culex tarsalis and Anopheles freeborni. Results indicated that good control of these vectors in different habitats was possible using Baygon^R wettable powder and technical grade malathion. Similarly, a test was conducted in Arizona against Cx. tarsalis using Abate^R granules as a larvacide.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E/AR 16 16	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA- CONTRACTOR ACCESS	9. LEVEL OF SUM
82 10 01	D. CHANGE	U	U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	A. WORK UNIT
10. NO. CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62770A	3M162770A870		CB	262 APC F902		
b. CONTRIBUTING	62770A	3M162770A871		CB			
c. CONTRIBUTING	STOG 82/83-6.2/3						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Integrated Pest Management - Black Flies							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
78 10		CONT		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER:				FISCAL YEAR		83	
c. TYPE:				CURRENT		1.4	
d. AMOUNT:				84		2.6	
e. KIND OF AWARD:				71			
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: US Army Medical Bioengineering				NAME: US Army Medical Bioengineering			
ADDRESS: Research & Development Laboratory				ADDRESS: Research & Development Laboratory			
Fort Detrick, Frederick, MD 21701				Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: Vorgetts, L J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Integrated Pest Management (IPM); (U) Biological Control; (U) Black Flies; (U) Disease Vector Control; (U) RAM I							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop methods of long-term suppression of immature stages of black flies and short-term suppression of adults without adverse effect on the environment. Currently, black flies seasonally restrict use of vast military training areas at several CONUS installations. Overseas, they are the primary vector of onchocerciasis or river blindness, a disease of military importance in parts of Africa and Central and South America. Effective vector control strategies will permit increased military training at the affected installations and will reduce the potential threat of casualties due to onchocerciasis.</p> <p>24. (U) Growth and development regulating hormones or their synthetic chemical analogues will be tested in the laboratory and field aquatic habitat. Formulations designed to attach to specific substrates and with release slowly to provide long lasting control will be evaluated. Attention will also be directed to the use of biological control agents including pathogenic bacteria and fungi. Improvement of standardized methods for making evaluations of such agents will be emphasized because present methodology does not provide results which can be utilized in interlaboratory comparisons. The use of diluents to improve the activity of adulticides will be studied as a possible approach for suppression of adult black flies.</p> <p>25. (U) 8210 - 8309. Methods for testing the efficacy of juvenile hormone (JH) compounds, which exert a delayed response in target species, were developed. Preliminary results indicate that the JH analogue, fenoxycarb, is active and effective in low concentrations against black fly larvae.</p> <p>Dose-Time Response Between <u>Simulium Vittatum</u> (Diptera:Simuliidae) Larvae and Abate 220E (Temephos). Frommer, R. L., Nelson, J. H., Gibbs, P. H., and Vorgetts, L. J. <u>J. Amer. Mosq. Cont. Assoc.</u> 43:70-71, 1983.</p>							

^a Available to contractors upon originator's approval

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DD FORM 1498

PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. DD FORMS 1498A 1 NOV 65 AND 1498 1 MAR 68 (FOR ARMY USE) ARE OBSOLETE

U.S. GOVERNMENT PRINTING OFFICE 1982 - 361-646/8346

DETAIL SHEET

TITLE: (U) Integrated Pest Management - Black Flies

FUNDING HISTORY: PY - 65K; CY - 63K; BY - 71K

PROBLEM DEFINITION: To develop a program of long-term suppression of black fly populations without adverse effects on the environment.

IMPORTANCE: Black flies are major vectors of onchocerciasis and rank high as military nuisance pests. In areas where onchocerciasis occurs, blindness due to this filarial infection is epidemic. In areas where large populations of black flies occur, training and marshalling areas cannot be used because of these pests. No effective means for control of these insects currently exists.

APPROACH: Growth and development regulating hormones or their synthetic chemical analogues and chemical pesticides will be tested in the laboratory and field aquatic habitat. Formulations that exhibit slow-release action will be emphasized. Attention will also be directed to the use of biological control agents including pathogenic bacteria and fungi. Laboratory and field testing will be designed to develop methods for manipulation, storage, and application of these agents.

ACHIEVEMENTS: Methods for testing the efficacy of juvenile hormone (JH) compounds, which exert a delayed response in target species, were developed. Preliminary results indicate that the JH analogue, fenoxycarb, is active and effective in low concentrations against black fly larvae.

PUBLICATIONS/PRESENTATIONS:

Dose-Time Response Between Simulium Vittatum (Diptera:Simuliidae) Larvae and Abate 220E (Temephos). Frommer, R. L., Nelson, J. H., Gibbs, P. H., and Vorgetts, L. J. J. Amer. Mosq. Cont. Assoc. 43:70-71, 1983.

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY					1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK.6.5b)	
3. DATE PREV SUMMARY ^a	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		9. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL			
10. NO./CODES: ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER		WORK UNIT NUMBER		
a. PRIMARY	62770A	3M162770A870		CB		264 APC F904		
b. CONTRIBUTING	62770A	3M162770A871		CB				
c. CONTRIBUTING	STOG 82/83-6.2/3							
11. TITLE (Precede with Security Classification Code) ^a (U) Evaluation of Skid Mounted and Special Purpose Pesticide Dispersal Equipment								
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a 009800 Medical and Hospital Equipment; 002400 Bioengineering								
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD		
75 03		CONT		DA		C. In-House		
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS		b. FUNDS (In thousands)
a. DATES/EFFECTIVE:				PRECEDING				
b. NUMBER: ^a				FISCAL		83		0.4
c. TYPE:				YEAR		CURRENT		23
d. KIND OF AWARD:				84		0.5		26
e. AMOUNT:								
f. CUM. AMT.								
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION				
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)				
NAME: Trudeau, T L				NAME: ^a Pierce, P E				
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237				
				SOCIAL SECURITY ACCOUNT NUMBER				
21. GENERAL USE				ASSOCIATE INVESTIGATORS				
Foreign Intelligence Not Applicable				NAME: Anderson, L M				
				NAME:				
				POC:DA				
22. KEYWORDS (Precede EACH with Security Classification Code) ^a (U) Insect Control; (U) Pesticide Dispersal; (U) Engineer Tests; (U) Ultra-Low Volume (ULV); (U) Skid Mounted Sprayer; (U) RAM I								
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.) 23. (U) Determine the durability of commercially available ultra-low volume (ULV) and powered pesticide dispersal equipment by comparative type engineering tests. Units will be used by military medical and engineer personnel for controlling mosquitoes and other insect pests. Results will provide user agencies with comparative durability and reliability data which can be used to insure purchase of the most effective equipment available. 24. (U) Determine the operational capabilities of skid mounted and special purpose ULV pesticide dispersal equipment by quantitative and qualitative methods. Measurable quantitative parameters include particle size determination and maintenance of desired pressure and flow rate. General engineering design observations will include corrosive effect of pesticide used during tests; verification of manufacturers' claims of performance specifications; general durability definitions as applied to mean time between breakdown and maintenance time; gas and oil consumption; and definition of high mortality repair parts. 25. (U) 8210 - 8309. Evaluations of Curtis-Dyna model Cyclone, Lowdnes Engineering model MD, Turbaire models Sprite and Fox, and Hudson model 98600 were completed. Evaluations of the Micro-Gen models G-3 and G-4 and BEECO Whispermist are programmed for FY 84.								

DETAIL SHEET

TITLE: (U) Evaluation of Skid Mounted and Special Purpose Pesticide Dispersal Equipment

FUNDING HISTORY: PY - 3K; CY - 23K; BY - 26K

PROBLEM DEFINITION: To continuously evaluate the basic engineering design, durability, and operational effectiveness of commercial pest control equipment.

IMPORTANCE: New and improved commercial items are frequently presented to the DOD as potential standard items. Most of these are suitable for DOD use. Others are unfit and should not be procured. Centralized, uniform testing of these items, on a request basis, is essential to maintain state-of-the-art technology in pest control and to keep from wasting tax dollars on unacceptable equipment.

APPROACH: Extensive equipment engineering and operational evaluations are conducted when requested by DOD agencies. These evaluations will include specification design, quality assurance testing as required by specification and procurement documents, and individual item reliability and durability analyses.

ACHIEVEMENTS: Evaluations of Curtis-Dyna model Cyclone, Lowdnes Engineering model MD, Turbaire models Sprite and Fox, and Hudson model 98600 were completed. Evaluations of the Micro-Gen models G-3 and G-4 and BEECO Whispermist are programmed for FY 84.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E:AR 16-16	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISB'N INSTR'N	8b. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	9. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL		
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER		TASK AREA NUMBER	WORK UNIT NUMBER		
a. PRIMARY	62770A	3M162770A870		CB	265 APC F905		
b. CONTRIBUTING	62770A	3M162770A871		CB			
c. CONTRACTING	STOG 82/83-5.2/3						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Pesticide Dispersal Evaluation Set							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
009800 Medical and Hospital Equipment; 002400 Bioengineering							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
75 04		85 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		0.8	
d. KIND OF AWARD:				84		1.2	
e. CUM. AMT.						22	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Pierce, P E			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J H			
				NAME: Anderson, L M			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Pesticide Dispersal; (U) Droplet Size; (U) Hot Wire Technology; (U) Insect Control; (U) EPA Requirements; (U) RAM I							
23. TECHNICAL OBJECTIVE, 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop a pesticide field evaluation set capable of measuring ultra-low volume (ULV) droplet size and total pesticide amounts applied by military dispersal equipment utilized in insect control operations.</p> <p>24. (U) Review commercial or military sources and, if the search is unsuccessful, fabricate new equipment and field evaluate for efficacy of design.</p> <p>25. (U) 8210 - 8309. A Defense Small Business Advanced Technology Program contract was completed by KLD Associates to develop and refine the "hot wire device" for characterization of liquid aerosol particles. As the monitor for this contract, USAMBRDL personnel completed several comparative studies with this device and the slide wave method of aerosol droplet collection. A phase II contract has been awarded to KLD Associates which will involve the design and production of a durable prototype evaluation set suitable for military use.</p>							

DETAIL SHEET

TITLE: (U) Pesticide Dispersal Evaluation Set

FUNDING HISTORY: PY - 18K; CY - 32K; BY - 22K

PROBLEM DEFINITION: To develop instrumentation that can accurately measure droplet size distribution in pesticide aerosols, thus providing precise calibration for pesticide dispersal units.

IMPORTANCE: Accurate calibration of dispersal equipment is essential for the effective and economical usage of ultra-low volume (ULV) pesticide formulations to provide protection for the soldier from disease vectors and pest arthropods. The dissemination of droplets that are too large for effective control can produce adverse environmental effects.

APPROACH: An optical imaging aerosol droplet sizing spectrometer has been secured and has been calibrated. A ground aspirator which produces a constant speed airflow past the sampling region of the spectrometer has been secured. The aspirator will provide isokinetic conditions at the sampling region and will also enable the data processing system of the spectrometer to provide aerosol concentration information. Various nonvolatile droplet aerosols will be dispersed, and information on their size distribution and propagation will be gathered. Additional experiments are planned in which the results of the aerosol spectrometer are compared with other droplet sizing techniques (e.g., slidewave, settling, hot wire sampler).

ACHIEVEMENTS: A Defense Small Business Advanced Technology Program contract was completed by KLD Associates to develop and refine the "hot wire device" for characterization of liquid aerosol particles. As the monitor for this contract, USAMBRDL personnel completed several comparative studies with this device and the slide wave method of aerosol droplet collection. A phase II contract has been awarded to KLD Associates which will involve the design and production of a durable prototype evaluation set suitable for military use.

PUBLICATIONS/PRESENTATIONS: None

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AR)616	
3. DATE PREV SUMMARY	4. KIND OF SUMMARY	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8. DISSEM INSTR ^a	9. SPECIFIC DATA - CONTRACTOR ACCESS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	10. LEVEL OF SUM A. WORK UNIT
82 10 01	D. CHANGE	U	U		NL		
10. NO / CODES ^a	PROGRAM ELEMENT	PROJECT NUMBER	TASK AREA NUMBER	WORK UNIT NUMBER			
a. PRIMARY	62770A	3M162770A870	CB	266 APC F906			
b. CONTRIBUTING	62770A	3M162770A871	CB				
c. XXXXXXXX	STOG 82/83-6.2/3						
11. TITLE (Precede with Security Classification Code) ^a							
(U) Integrated Pest Management - Mosquitoes							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
005900 Environmental Biology; 002600 Biology							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
79 10		85 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		19. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (in thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		4.9	
d. KIND OF AWARD:				84		3.0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Vorgetts, L J			
TELEPHONE: 301-663-7685				TELEPHONE: 301-663-7237			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME: Nelson, J H			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Integrated Pest Management (IPM); (U) Biological Control; (U) Mosquitoes; (U) Disease Vector Control; (U) RAM I							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
<p>23. (U) Develop methods for mosquito control that integrate physical, chemical, and biological control methods so as to maintain effective control economically without undue damage to the environment. Provide baseline laboratory and field data on the efficacy of various insecticides for control of mosquito larvae from which field application rates and methods will be developed for use by Army preventive medicine units.</p> <p>24. (U) Define mosquito problems at a US Army installation using previously accumulated data and on-site observations. Propose strategies for control of the problems which integrate physical, chemical, and biological methods. Proposed strategies will be implemented on-site to test the integrated pest management concept as it applies to mosquitoes.</p> <p>25. (U) 8210 - 8309. Studies of the bacterial pathogen <u>Bacillus thuringiensis</u> var. <u>israelensis</u> (Bti) demonstrated that wettable powder (WP) formulations are extremely effective against mosquito larvae, but the duration of activity is very short (<24 hr). Procedures for testing slow release (SR) Bti were developed. Laboratory tests of available SR Bti indicated that some increase in duration of activity occurred, but the increase did not appear to be sufficient to offset increased production costs. Field trials indicate that the addition of diluents increases the effectiveness of ground applications of mosquito adulticides without increasing the amount of active ingredient applied.</p>							

DETAIL SHEET

TITLE: (U) Integrated Pest Management - Mosquitoes

FUNDING HISTORY: PY - 204K; CY - 172K; BY - 108K

PROBLEM DEFINITION: Rapid advances are being made in insect pest management technology in the civilian sector. Among those not yet fully capitalized on by military pest management are ultra-low volume pesticide dispersal technology, controlled release and microencapsulation formulations, use of hormone analogues, and the impending availability of effective, economical biological control agents for mosquitoes and black flies. While evaluation and assimilation of some of this technology by the Army is under way, a context is needed in which to tie together conventional and developing technology into an integrated pest management system for use by the military to control mosquitoes efficiently, economically, and with minimal environmental insult.

IMPORTANCE: Military medical history demonstrates that protection of troops from vector-borne diseases may be vital to the outcome of armed conflict in many parts of the world. Therefore, it is of critical importance that insect pest/vector control technology in the military be developed and maintained at the highest state-of-the-art. The requirement that insect pest management be done with minimal environmental insult in CONUS and in host countries where host-country agreements so specify focuses special attention on hormone analogues and candidate biological control agents.

APPROACH: Field study areas will be identified where developing mosquito control technology can be evaluated for suitability for Army use. Of immediate interest are hormone analogues and biological control agents nearing commercial availability.

ACHIEVEMENTS: Studies of the bacterial pathogen Bacillus thuringiensis israelensis (Bti) demonstrated that wettable powder (WP) formulations are extremely effective against mosquito larvae, but the duration of activity is very short (<24 hr). Procedures for testing slow release (SR) Bti were developed. Laboratory tests of available SR Bti indicated that some increase in duration of activity occurred, but the increase did not appear to be sufficient to offset increased production costs. Field trials indicate that the addition of diluents increases the effectiveness of ground applications of mosquito adulticides without increasing the amount of active ingredient applied.

PUBLICATIONS/PRESENTATIONS: None

HEALTH HAZARDS OF MILITARY MATERIEL

RESEARCH AND TECHNOLOGY WORK UNIT SUMMARY				1. AGENCY ACCESSION ^a	2. DATE OF SUMMARY ^a	REPORT CONTROL SYMBOL DD-DR&E(AK)6 16	
3. DATE PREV SUMMARY ^a	4. KIND OF SUMMARY ^a	5. SUMMARY SCTY ^a	6. WORK SECURITY ^a	7. REGRADING ^a	8A. DISB'N INSTR'N	8B. SPECIFIC DATA - CONTRACTOR ACCESS	9. LEVEL OF SUM A. WORK UNIT
82 10 01	H. TERMINATION U		U		NL	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
10. NO./CODES: ^a		PROGRAM ELEMENT		PROJECT NUMBER		TASK AREA NUMBER	
a. PRIMARY		62777A		3E162777A878		CA	
b. CONTRIBUTING						241 APC F955	
X-6677777777		STOG 82/83-6, 2/2					
11. TITLE (Precede with Security Classification Code) ^a							
(U) Field Provision of Nonpyrogenic Water							
12. SCIENTIFIC AND TECHNOLOGICAL AREAS ^a							
007800 Hygiene and Sanitation; 010100 Microbiology; 008300 Inorganic Chemistry							
13. START DATE		14. ESTIMATED COMPLETION DATE		15. FUNDING AGENCY		16. PERFORMANCE METHOD	
81 03		83 09		DA		C. In-House	
17. CONTRACT/GRANT				18. RESOURCES ESTIMATE		a. PROFESSIONAL MAN YRS	
a. DATES/EFFECTIVE:				PRECEDING		b. FUNDS (In thousands)	
b. NUMBER: ^a				FISCAL YEAR		83	
c. TYPE:				CURRENT		3.0	
d. AMOUNT:				84		0.0	
e. KIND OF AWARD:						207	
f. CUM. AMT.						0	
19. RESPONSIBLE DOD ORGANIZATION				20. PERFORMING ORGANIZATION			
NAME: ^a US Army Medical Bioengineering Research & Development Laboratory				NAME: ^a US Army Medical Bioengineering Research & Development Laboratory			
ADDRESS: ^a Fort Detrick, Frederick, MD 21701				ADDRESS: ^a Fort Detrick, Frederick, MD 21701			
RESPONSIBLE INDIVIDUAL				PRINCIPAL INVESTIGATOR (Furnish SSAN if U.S. Academic Institution)			
NAME: Trudeau, T L				NAME: ^a Duncan, J B			
TELEPHONE: (301) 663-7685				TELEPHONE: (301) 663-2036			
21. GENERAL USE				SOCIAL SECURITY ACCOUNT NUMBER:			
Foreign Intelligence Not Applicable				ASSOCIATE INVESTIGATORS			
				NAME:			
				NAME:			
				POC:DA			
22. KEYWORDS (Precede EACH with Security Classification Code)							
(U) Pyrogen Free Water;							
(U) Field Production; (U) ROWPU; (U) Inorganic Chemistry; (U) RAM III							
23. TECHNICAL OBJECTIVE, ^a 24. APPROACH, 25. PROGRESS (Furnish individual paragraphs identified by number. Precede text of each with Security Classification Code.)							
23. (U) The objective is to ascertain the feasibility of current off-the-shelf technology for use in the production of pyrogen-free water. The field production of pyrogen-free water would eliminate the logistical problem of supply to field hospitals during combat operations. The influent for a pyrogen-free water unit would be comprised of the effluent from the ROWPU at a water point.							
24. (U) The treatment train will consist of a roughing filter, reverse osmosis unit, carbon filter, ion exchange unit, pyrogen filter, and 0.22 µm filter. Product water will be evaluated for pyrogens (LAL), cellular toxicity (HeLa), and conform to US Pharmacopeia (USPXX).							
25. (U) 8210 - 8309. This research will be transferred to Field Materiel Development Division of this Laboratory.							

PRECEDING PAGE

DETAIL SHEET

TITLE: (U) Field Provision of Nonpyrogenic Water

FUNDING HISTORY: PY - 82K; CY - 207K; BY - OK

PROBLEM DEFINITION: To ascertain the feasibility of off-the-shelf technology for the production of nonpyrogenic water in a field environment.

IMPORTANCE: If generation of nonpyrogenic water can be accomplished in the field, it will alleviate a large logistical burden on the resupply of parental solutions.

APPROACH: A treatment train consisting of turbidity filter, reverse osmosis, carbon filter, ion exchange, pyrogen filter, and a 0.22 micrometer filter will be evaluated.

ACHIEVEMENTS: The above materials have been received. LOA staffed through AHS, FSH to be sent to HQDA. Treatment train built. Testing completed with the successful production of USP water for injection.

PRESENTATION: Presentation of the project to the Conference of Armed Forces Society of Allied Laboratory Scientists during March 1983 at San Antonio, TX.

DISTRIBUTION LIST

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1	Dir of Biol & Med Sciences Div Office of Naval Research 800 N. Quincy Street Arlington, VA 22217
1	CO, Naval Medical R&D Command National Naval Medical Center Bethesda, MD 20014
1	HQ AFMSC/SGPA Brooks AFB, TX 78235
1	Director of Defense Research and Engineering ATTN: Assistant Director (Environmental & Life Sciences) Washington, DC 20301
1	Department of Veteran's Affairs Central Development Unit 131 Sturt Street SOUTH MELBOURNE, VIC. 3205 AUSTRALIA
2	OTSG (DASG-HCL-P) WASH DC 20310

MANUSCRIPTS CLEARED FOR PUBLICATION/PRESENTATION

1 October 1982 - 30 September 1983

1. Presentation to Triservice Aeromedical Research Panel, William H. Conway. Oral presentation at Fort Rucker, 18 October 1982.
2. Review of Introduction to Linear Regression Analysis, Paul Gibbs. Journal publication in Technometrics Book Review Section.
3. Egg Production in Female Callosamia promethea as a Function of Pupal Size and Adult Longevity, Miller, Thomas A., Cooper, William J. and Jerry W. Highfill. Journal publication in Annals - Entomological Society of America.
4. Histopathologic Response in the Fathead Minnow (Pimephales promelas) Exposed to 2-4 Dinitrotoluene in an Early Life Stage Toxicity Test, Stephen G. Broich. Technical Report #8209.
5. Pesticide Laws and Regulations, Chapter 6, TM 50632, Military Pest Management Handbook, Thomas A. Miller. TM Revision. For publication in TM Revision.
6. Catalytic Degradation of Trihalomethanes, Hoke, Steven H., Baxter, Louanna J. and Michael Burns. Abstract for publication in USAMRDC Research Newsletter.
7. Identification of Field Drinking Water, Burrows, Dr. E. and Dr. S. Schaub. Abstract for publication in USAMRDC Research Newsletter.
8. Smoke/Obscurants Health Effects Research Update, CPT Gary M. Bratt. Abstract for presentation at Smoke/Obscurants Symposium VII, Adelphi, MD, 26-28 April 1983.
9. A Data Base Assessment of Environmental Fate Aspects of Nitroguanidine, Kathryn Kenyon. Technical Report #8214.
10. Specific Adsorbents for Wastewater Pollutants, Dr. R.K. Kulkarni. Extended Abstract for Preprints for presentation at ACS meeting, Washington, DC, August 1983.
11. Catalytic Degradation of Trihalomethanes, Hoke, Steven H., Baxter, Louanna and M. Burns. Journal Publication for publication in Water Research.
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